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**The U.S. Department of the Interior's
Proposed Rules for Enforcement of
the Reclamation Act of 1902:
An Economic Impact Analysis**

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A Staff Report by the Economics, Statistics, and Cooperatives Service

U.S. Department of Agriculture

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The U.S. Department of the Interior's Proposed Rules
for Enforcement of the Reclamation Act of 1902:
An Economic Impact Analysis
A Staff Report by the
Economics, Statistics and Cooperatives Service, USDA

Summary

This report was prepared by a team of USDA employees in California, Idaho, Nebraska and Washington, D.C., in response to a request from the Secretary of Agriculture. The report:

- * summarizes the Department of the Interior's proposed rules, regulations, and procedures for enforcement of the Reclamation Act of 1902;
- * examines the economic and social consequences of the U.S. Department of the Interior's recent proposal concerning the sale of excess lands receiving irrigation water through the Bureau of Reclamation;
- * identifies regions and commodities affected by the proposal; and
- * describes likely changes in food and fiber production and rural communities in the Westlands Water District and Imperial Irrigation District in California, the North Platte Project in Nebraska and Wyoming, and the Columbia Basin Project in Washington.

The report draws heavily on secondary data and information sources, and personal contacts with Bureau of Reclamation employees, university researchers, State officials, county agricultural extension workers, and farmers.

Acreage limitation provisions of the Reclamation Act of 1902:

- * Are intended to distribute the benefits of Reclamation water projects to small family farms. These benefits take the form of interest-free construction loans and subsidized water prices. For example, Interior has estimated the subsidy in Westlands to be \$1,540 per acre, which approximates the current market price for land in the District. The California Department of Water Resources has calculated that State water delivery to Westlands would cost an average of \$21 per acre-foot, compared to the current price of \$7.50.
- * Generally limit the irrigable land for which an individual owner is eligible to receive project water to 160 acres, or 320 acres for husband and wife.

- * Are the source of legal controversies, including a recent court decision that the 160-acre limitation does apply to Imperial Valley, reversing a 1933 opinion of former Secretary of the Interior Ray Lyman Wilbur. This court decision has disrupted agricultural financing and halted long-term capital improvements in Imperial.
- * As administered, do not effectively prevent many large ownership units and farming operations from receiving irrigation water. The average operating unit in Westlands is 2,889 acres.

The following terms are used in describing Reclamation law and procedures:

- * Irrigable land is the area to which acreage limitations are applicable.
- * Excess land is all irrigable land capable of being served by project water owned by an individual in excess of 160 acres, unless otherwise authorized by statute.
- * Project water is furnished through Federally-financed facilities to an irrigation district pursuant to a water-service contract with the United States.
- * Recordable contract is a legal document in which the landowner agrees to sell specified excess land according to the terms and conditions satisfactory to the Secretary of the Interior in order to receive project water.

Responding to a court order, Interior recently proposed rules and regulations to be used in administering acreage limitation provisions and the sale of excess lands. Five key aspects of the proposed rules are:

1. Reinstatement of the residency requirement.

- * Under the proposed rules, a buyer of excess land must live, at time of purchase, within 50 miles of the tract receiving a project water supply. The intent is to prevent "absentee" investors from acquiring excess land and to encourage local ownership and control of farming.
- * Residency generally has not been imposed as a requirement for receiving project water since it was omitted from the Omnibus Adjustment Act of 1926.
- * This provision applies to buyers of excess land, not to present landowners. However, rules will be issued as soon as practicable requiring present landowners who wish to receive project water to comply with the residency requirement.

- * Application may impose hardships on widows and retirees who wish to reside outside the 50-mile limit. However, sale of this land and reinvestment in nonfarm assets, or other farm assets, is not precluded.

2. Multiple ownerships will be approved for husband and wife and direct lineal descendants.

- * Family partnerships and family corporations will be allowed to own 160 acres for each family member who is an eligible nonexcess owner.
- * Publicly traded corporations and limited partnerships will not be able to acquire large land holdings. Individual owners will be limited to one nonexcess entitlement for all Reclamation projects.

3. Leasing will be restricted to 160 acres per eligible owner and a seller of excess land may not lease the same parcel from the first buyer.

- * This rule tends to limit the size of a farming operation that may receive project water. Presently, there are no significant restrictions on leasing.
- * Under the proposed rules, a family with four members living within a radius of 50 miles could own 640 acres and lease an additional 640 acres of irrigable land.
- * Leasing restrictions may limit ability of young people to get started in farming.

4. All new water service or repayment contracts will provide that recordable contracts must require disposition within 5 years and buyers will be chosen by lottery if there is more than one bidder.

- * Existing recordable contracts with a 10-year disposition period will be honored.
- * Owners of excess land no longer have the right to choose the buyer of their land, but family members shall have preference. And personal property must be sold separately.

5. Price approval rules are strengthened to guarantee that the sale price of excess land does not reflect the value of project benefits accruing to that land.

- * These rules are necessary because large subsidies are often included in calculating Federal water prices. Price approval for subsequent resales eliminates the possibility of the first buyer immediately reselling nonexcess land at the much higher market price which reflects the large subsidy.

Presently, about 150 Bureau of Reclamation projects provide water services in 17 western States. Some important characteristics:

- * There are nearly 11 million acres of irrigable land under these projects.
- * Approximately 40 percent of these lands produce crops which are under U.S. Department of Agriculture price support programs.
- * Leading crops by value of production are vegetables, fruits, cotton, sugar beets, and cereal grains.
- * 2.3 million acres, in 6,041 ownership units, are estimated to be excess land.
- * 0.5 million acres of excess land are eligible for project water because the owner has signed a recordable contract, by statute, or the irrigation district has repaid the interest and principal on Federal funds.
- * 1.8 million acres of excess land are ineligible for project water. But, 47 percent of this land was actually served at the discretion of local irrigation districts in 1976.
- * California has slightly more than 80 percent of all excess land, with Texas, Arizona, Nebraska, Montana, and Wyoming, accounting for a total of 7 percent.
- * The Westlands Water District has 302,000 acres of excess land with 224,000 acres eligible for project water under recordable contract.
- * Due to recent court decisions, an estimated 265,000 acres in the Imperial Irrigation District and 660,000 acres in districts served by Corps of Engineers' projects in California are now excess land. Appeals are expected. This acreage accounts for 89 percent of all land that is ineligible but served project water.

* Assuming only land on which project interest and principal has been repaid is excluded from the new rules, 2.1 million acres is the upper limit of the amount of land to be sold or transferred. A more realistic estimate of excess land to be sold is as follows:

258,764 acres under recordable contract to be sold over
the next 10 years
57,103 acres eligible by statutes that will expire
850,008 acres ineligible for project water, but served
1,165,875 estimated acres of excess land to be sold (or transferred).

Almost 1 million acres of excess land do not receive project water, therefore the rules for disposition do not apply.

If the Imperial Irrigation District and projects served by the Corps of Engineers' reservoirs are excluded, less than 500,000 acres of excess land are likely to be sold. About 315,000 acres of all excess land are now under recordable contract or statutes that will expire.

One of the most widely debated issues in the acreage limitation controversy is the size of farm adequate to provide for the needs of a single family. Farm budgets, reflecting the general types of farming in selected regions, are used to provide a measure of the economic viability of alternative farm sizes.

* Expected annual returns to management and operator labor are:

Range of Returns to Management and Operator Labor							
	Current Land Price			Pre-Project Land Price*			Crops
	Farm prices - 15%**	Expected	Farm prices + 15%	Farm prices - 15%	Expected	Farm prices + 15%	
<u>Westlands</u>							
160 Acres	0	\$ 15,000	\$ 30,000	\$ 10,000	\$ 25,000	\$ 40,000	Cotton, Barley, Tomatoes
320 Acres	\$ 3,000	34,000	64,000	23,000	54,000	84,000	Cotton, Barley, Tomatoes
640 Acres	-(15,000)	41,000	94,000	25,000	81,000	135,000	Cotton, Barley, Tomatoes, Alfalfa
<u>Imperial</u>							
160 Acres	-(8,000)	6,000	20,000	(Pre-project land price not available)			Cotton, Alfalfa
320 Acres	-(7,000)	21,000	49,000				Cotton, Alfalfa
640 Acres	-(16,000)	61,000	128,000				Cotton, Alfalfa, Wheat, Sorghum, Cantaloupes
<u>North Platte</u>							
160 Acres	-(1,000)	7,000	16,000	(Pre-project land price not available)			Sugar Beets,
320 Acres	-(5,000)	14,000	31,000				Dry Beans,
640 Acres	-(11,000)	23,000	57,000				Corn, Alfalfa, all sizes
<u>Columbia Basin</u>							
160 Acres	-(11,000)	19,000	39,000	5,000	35,000	55,000	Wheat, Potatoes, all sizes
320 Acres	-(7,000)	53,000	113,000	25,000	85,000	145,000	
640 Acres	5,000	125,000	245,000	69,000	189,000	309,000	

* Differential between current land price and pre-project land price is very important in determining returns to management and operator labor.

** Budgets for the Columbia Basin reflect farm price ranges of + and - 25 percent.

- * The returns shown in these budgets are greatly influenced by the subsidies on land price and project water. For example, in Westlands the use of pre-project land prices, instead of current market price accounts for \$40,000 of the \$81,000 return to labor and management shown for the 640 acre farm. According to a separate analysis by Interior, the total annual subsidy, including all Federal costs of the project, is \$76,000 for the 640 acre Westlands farm, or 94 percent of the return in this particular budget.
- * An attempt was made to include revenues and costs that would most likely exist for a purchaser of excess land. Estimated returns are based on recent price-cost relationships and modern production practices; they assume average to better-than-average management ability.
- * Farm budgets provide one measure of economic viability based on specific assumptions. They do not adequately reflect the risky nature of many farming enterprises. Prices received by farmers are affected by variability in weather, foreign trade, domestic demands, etc. Farm incomes are highly sensitive to commodity price variations. For budgets used in this study, commodity price variations of 15 percent resulted in 60 to 100 percent changes in returns to management and operator labor. Current farm programs, designed to stabilize prices and income, will help reduce these variations.
- * Nationally, farm production costs have risen 7 percent annually since 1967, resulting in a cost-price squeeze that has made farming small acreages increasingly difficult. And, all farmers are not able to adopt the crop rotations and apply the production techniques and management assumed in the farm budget calculations.
- * Annual returns to management and operator labor by farm size vary among the four regions studied. Given the assumptions of the farm budgets, all farm sizes considered in the Westlands and Columbia Basin result in annual returns exceeding median family income. In Imperial and North Platte, using current land prices, 320 acres are required to achieve annual returns equal to or greater than median family income. In view of rising production costs, price variability and other risks not considered fully in this analysis, larger operating units may be necessary to provide a return to management and operator labor sufficient to maintain a viable farming operation over time. In all regions, larger farming operations provide greater capacity to spread risk, absorb rising production costs, and take advantage of economies of size.
- * No provision of the Reclamation Act excludes off-farm employment. Many farm families supplement their farm earnings with nonfarm income. In California, farm families who work off the farm average about \$15,000 per year in off-farm income. Sixty percent of the farm units in California report off-farm income. Off-farm income increases the viability of smaller farm units.

The relationship between economic efficiency (cost per unit of product output) and farm size is also widely debated. While much additional work needs to be done, evidence supports the following conclusions:

- * In all regions, the larger farms have lower costs per unit of production.
- * Comparing cotton production costs per pound on a 160-acre farm and a 640-acre farm, the larger farm has a 14 to 16 percent advantage in California. Earlier studies show that average cost per unit of production declines about 10 percent on Imperial County crop farms when size is increased from 320 acres to 2,500 acres.
- * In the North Platte, the average cost of producing sugar beets, dry beans, and corn is 15 to 20 percent higher on a 160-acre farm than on a 480-acre farm.
- * In the Columbia Basin, cost savings of 8 to 12 percent are achieved in moving from a 160-acre to a 320-acre farm, and cost savings of 6 percent or less are achieved in moving from a 320-acre to a 640-acre farm.
- * The average irrigated farm in California has 164 acres of irrigated land.

Other important consequences of the proposed rules and regulations include the following:

- * Creation of smaller farms in Westlands and Imperial would probably cause a shift to a slightly less intensive cropping pattern over the long run, a slight decline in farm income, and moderate price increases for some winter vegetables. Specialty crop production would not expand because of limited market demand and higher producer risk. Total production of cotton, wheat, barley and processing tomatoes in California would be unchanged.
- * Relatively few changes in farm size and production patterns would be expected in the North Platte and Columbia Basin Projects. Some large farming operations that produce intensive crops such as potatoes and sugar beets lease more land than would be allowed under the proposed rules.
- * An estimated 950 to 1,000 new farm operations (480 acres per unit) would be created in California (about 630 farms in Westlands and 350 farms in Imperial). This involves a 300 percent increase in the number of farms in Westlands and a 50 percent increase in Imperial. In the North Platte and Columbia Basin, most excess land holdings would probably be handled through ownership transfer within families rather than sale. Few new farms, maybe 30 to 50 in each of these regions, would be expected. However, sufficient information is not available to predict with a high degree of accuracy the number of new farms that may be created.

- * Breaking up large land holdings into smaller farms may cause some disinvestment problems. High capacity farm machinery designed for large acreages will be sold to farmers in non-reclamation areas or custom operators. Also, impacts due to uncertainty surrounding possible legal actions and decisions are particularly evident in the Imperial Irrigation District. Long-term investment in land improvements such as land leveling and subsurface drainage have ceased, and land values under the proposed rules are uncertain.
- * In Westlands and Imperial, population could increase 4,500 to 5,000, requiring local government expenditures of about \$3.2 million per year in California. However, since these regions have experienced steady population growth in recent years, there would be little impact. Impacts on local governments and communities would be nil in the North Platte and Columbia Basin Projects. Moreover, the small family farm operations may displace hired workers on the larger farms required to sell excess land. Thus the shift to a larger number of farms may have little impact on the local economy.
- * There is some evidence that communities surrounded by small farms offer a higher quality of life (a larger local business community, more diversified and stable employment opportunities, more schools, parks, and playgrounds, and more social and civic organizations) than towns with very large farms nearby.

Introduction

The primary objective of this study is to examine the economic consequences of the U.S. Department of the Interior's recent proposal concerning the sale of excess lands receiving irrigation water through the Bureau of Reclamation. Under the proposed rules, excess landowners would be required to divest holdings that are inconsistent with the Reclamation Act of 1902 and sell the land to an eligible owner. Specific regulations covering residency, ownership, leasing of recordable contracts, and price approval were published by the Interior Department in the Federal Register, August 25, 1977.

This analysis is divided into three parts:

- a. Review of the proposed rules, regulations, and procedures,
- b. Identification of the regions and commodities affected by the proposal, and
- c. Discussion of major economic consequences in the Westlands Water District and Imperial Irrigation District in California, the North Platte Project in Nebraska and Wyoming, and the Columbia Basin Project in Washington.

The economic consequences deal with the amount of excess lands likely to be sold, the number and size of farming operations that may be created, changes in cropping patterns and agricultural sales, and likely changes in total population and demand for community services. This report does not analyze economic consequences for other regions served by the Bureau of Reclamation, nor all aspects of Reclamation programs. It does attempt to identify consequences of the proposed rules and regulations as they relate to food and fiber production and rural communities in the three regions specified.

The proposed rules and regulations raise two general types of questions which economists can help answer. First, are the acreage limitation provisions (as implemented by the proposed rules) incompatible with modern day, capital-intensive agriculture? Can small family farms generate sufficient income to be economically viable? Is there a loss in economic efficiency that results in higher prices and reduced consumption of food and fiber products? Second, how does the structure of farming under the proposed rules and regulations influence the cost of providing Government services, tax revenues, and the viability of rural communities? What is the trade-off between the economic efficiency of large scale farms and the equity of distributing the Federal subsidy to more recipients?

Secretary of the Interior Cecil D. Andrus has proposed new rules and procedures to tighten implementation of the acreage limitation provisions of Reclamation law. Over the years, Congress has designed Reclamation law to make available opportunities for the establishment and strengthening of family-size farms in the Western States and to widely distribute windfall gains from Federally subsidized irrigation development, distribution and drainage projects. These policy objectives are reflected in the Bureau of Reclamation's internal guidelines, Reclamation Instructions, (Series 210 Land, Part 219 Excess Land), as follows:

"The policy of limiting the area of land for which project water may be supplied under the Reclamation Laws is designed to: (1) provide opportunity for a maximum number of settlers on the land, (2) distribute widely the benefits from public-supported reclamation where interest-free money is involved, (3) promote the family-size farm as a desirable form of rural life. In the authorizing legislation and through Bureau practice, the objective of controlling speculation in project land has been linked integrally with acreage limitation" (33, p. 15). 1/

Reclamation laws provide several types of subsidy through the methods used to allocate and determine the repayment of project costs. In a recent report to the President, the National Water Commission states that "...The principal elements of the subsidy are (1) interest-free, long-term loans, (2) payment of irrigation costs by electric power revenues and by revenues from the sale of municipal and industrial water, and (3) allocation, to an unwarranted extent, of joint costs of multiple-purpose projects to nonirrigation features" (36, p. 2). In 1976, the Comptroller General estimated the present value of the subsidy to the Westlands Water District in California at \$658 million, or \$1,150 per acre (4). More recently, it was reported that the U.S. Department of the Interior has computed that the Federal subsidy is \$1,540 per acre in Westlands (14). The California Department of Water Resources has calculated that State water delivery to the Westlands Water District would cost an average of \$21 per acre-foot, compared to the current price of \$7.50 (36, p. 8). Using the State water price as a non-subsidized standard, the annual subsidy accruing to irrigators in Westlands is about \$16 million.

The acreage limitation or excess land provisions of Reclamation law limit the amount of irrigable land for which an individual owner may receive water from a Federal project to 160 acres, or 320 acres for a husband and wife. 2/ Many areas now served by water from Reclamation projects were originally dry-farmed or grazed in blocks much larger than 160 acres. When local irrigation districts are organized to contract for delivery of Reclamation water, landowners with holdings exceeding 160 acres may receive project water if they have signed a recordable contract, or are eligible by statute. A recordable contract requires

1/ Underscored numbers in parenthesis refer to Literature Reviewed at the end of the report.

2/ Technical definitions of selected terms are provided in a glossary, see Appendix I. Excess land is all irrigable land beneficially owned by one landowner in excess of 160 acres, unless otherwise authorized by law.

the landowner to dispose of his excess lands within a specified period (i.e., usually 10 years) to an eligible nonexcess owner at a price approved by the Secretary of the Interior.

There are many very large farming operations that receive irrigation water from Reclamation projects, for several reasons. First, the land may be under recordable contract. Second, the amount of land that a farmer leases from other landowners has not been limited. The acreage limitation provisions pertain to ownership of land and have not dealt explicitly with the size of an individual's farming operation. Third, a number of business arrangements other than ownership by an individual have been permitted to establish eligible nonexcess holdings. Such arrangements include joint tenancies, corporations, trusts, partnerships, and tenancies in common. Fourth, in the past, an individual's nonexcess acreage was determined on the basis of the irrigation district in which the land was located. This allowed a landowner to own 160-acre tracts in more than one district.

Much controversy also surrounds the residency requirement aspect of the acreage limitation provisions. Under the Reclamation Act of 1902, the landowner was required to "reside on or in the neighborhood of the land" until the lien created by the water right application was satisfied. With passage of the Omnibus Adjustment Act of 1926, the irrigation districts assumed liability for payments due to the United States and the residency requirement was omitted. Based on the 1926 Act, Interior Department lawyers took the position that the residency requirement was no longer a requirement of law. Residency has not been imposed as a requirement to receive water from a Reclamation project since 1926.

Several legal actions have been initiated. Last year, National Land for People, Inc., filed suit against the Bureau of Reclamation questioning procedures used in approving sales of excess land in the Westlands Water District. The court ruled in favor of National Land for People and enjoined the Secretary of the Interior from approving land sales in Westlands until administrative rules were adopted. In August 1977, denying the validity of a 1933 opinion of Secretary Ray Lyman Wilbur, a three-judge panel from the Ninth Circuit Court in San Francisco ruled that the 160 acre limitation does apply to the Imperial Valley. In the same action, an appeal to enforce the residency requirement was dismissed because of lack of standing of the plaintiff.

In response to the court order arising from the Westlands suit, Interior has issued proposed regulations to be used in administering the acreage limitation provisions and sale of existing excess lands. The following statements summarize the proposed rules and regulations and explain how they change procedures used to administer Reclamation law.

Residency Requirement: The proposed regulations require a purchaser of excess land to reside on or within a radius of 50 miles of the land receiving water from a Federal project. The intent is to prevent "absentee" investors from acquiring excess land. Rules and regulations will be issued as soon as practicable requiring present landowners who wish to receive project water to comply with the residency requirement.

Ownership: Multiple ownerships used to be approved if a "loose" family relationship existed among all members, or where the effect of multiple ownership was to break up excess land holdings. The proposed rules will allow multiple ownership only where a direct lineal family relationship exists among all members and any prospective owner qualifies as an eligible nonexcess owner. A direct lineal family relationship means parents, children, grandchildren, or grandparents. Family partnerships and corporations will be allowed to own 160 acres for each family member, but publicly-traded corporations, limited partnerships, and other business arrangements will be excluded.

Also, an individual owner will be limited to only one nonexcess entitlement for all Reclamation projects. Eligibility for ownerships will no longer be established on the basis of the irrigation districts in which the land is located.

Leasing: Currently, there are no significant restrictions on leasing. The proposed rules prohibit leasebacks (i.e., the seller of excess land may not lease the same parcel from the first buyer) and limit the number of acres an individual can lease to 160 acres of project land.

Disposal Within 5 Years: All new recordable contracts will require disposition within 5 years after the Secretary of the Interior determines that project water is available, instead of the present 10 years. A recordable sales contract must be signed prior to receiving project water. Existing recordable contracts with a 10-year disposition period will continue to be honored.

In the past, the owner of excess land had the right to choose the buyer of his land. The proposed rules state that a purchaser will be chosen by lottery or other impartial means from those who qualify and express an interest in a particular parcel of land. Family members will be given preference. Personal and nonfixture property must be sold separately, and the purchaser of the land is not required to buy such items as a condition of the land sale.

Price Approval: Sale prices of excess land must be approved by the Secretary of the Interior, not only on the initial sale as now required, but for all resales 10 years after the initial sale. After 10 years and until one-half the construction charges are paid, sales will be monitored to prevent unreasonable gains from any resale.

Price approval guarantees that the sale price of excess land does not reflect the value of project benefits accruing to that land. The proposed rules eliminate the possibility of immediately reselling nonexcess land at a much higher market price reflecting the capitalized value of low-priced irrigation water. Price approval does not extend to include leasing arrangements.

The proposed rules and regulations also deal with the commingling of project and nonproject water and use of Class 1 equivalency concepts. However, these procedures do not reflect any substantial change from current practices.

The proposed rules are intended to insure that benefits of Federal water projects accrue to small family farmers and to prevent land price speculation. However, it is possible that family farmers may suffer unexpected consequences. For example, under the proposed rules, multiple ownerships will be allowed only among direct lineal descendants and husband and wife. Therefore, a family partnership or corporation involving a father and two sons could be adversely affected at the time of the father's death.

Restricting the amount of land an individual can lease to 160 acres may reduce the efficiency and economic viability of family farms. However, under the proposed rules, a family with four members living within a radius of 50 miles could own 640 acres and lease an additional 640 acres or irrigable land. Some farmers depend heavily on rented land, using their own-capital and borrowing capacity to acquire modern machinery. The leasing restricting may also eliminate an avenue that young people have used to get started in farming. Furthermore, the ownership and leasing rules may "freeze" the size of farming operations, making it difficult to adopt new technology and placing farmers who receive project water at a competitive disadvantage with other farmers.

The selection of purchasers by lottery may create problems for new farmers in obtaining contiguous acreage and complicate planned expansion. Simmons and Cook (23, p. 44) point out that "...It would be difficult for a lottery system to deal both equitably and efficiently with the problem of varying acreage limitations for farmers with different sized families. For example, excess land parcel A contains 320 acres, and an adjacent excess land parcel B contains 80 acres. Farmer Smith has a wife, and farmer Jones has a wife and one child. Farmer Jones would therefore be eligible to buy both parcel A and B, while farmer Smith would be eligible only to buy parcel A or B, but not both. If farmer Smith won the lottery and buys parcel A, and parcel B has no other adjacent excess lands, then there is a high likelihood that parcel B will remain unpurchased."

Furthermore, while the proposed rules apply to a purchaser of excess land, the residency requirement may create unexpected consequences if extended to present landowners. Requiring residency within 50 miles may seriously reduce the economic viability of a family farm if a child ultimately decides to reside outside the local community. Also, the flexibility of a farmer or his widow to rent his land and retire in a community of his choice is reduced.

Regions and Commodities Affected by the Proposed Rules and Regulations

About 150 Bureau of Reclamation projects provide water services in 17 Western States. In 1975, water deliveries totaled 26 million acre-feet for irrigation, 1.6 million acre-feet for municipal and industrial use, and 0.5 million acre-feet for other nonagricultural uses.

In 1975, Reclamation projects encompassed nearly 11 million acres (Table 1). Slightly more than 9.3 million acres were actually irrigated, including 487,000 acres on which two or more crops were grown. A farm population of 595,000 persons received all or part of its livelihood on this land. The average operating unit on Reclamation projects included 71 irrigable acres. Full-time farms averaged 102 acres and part-time farms averaged 15 acres.

A. Excess Lands

According to U.S. Department of the Interior data, based on information supplied by individual irrigation districts, almost 2.3 million acres of irrigable land held in 6,041 ownership units was classified as excess land (Table 2). Excess lands are eligible for project water if (1) the owner has signed a recordable contract; (2) earlier statutes provide exemption or modifications of the acreage limitation; or (3) the irrigation district has repaid the interest and principal on Federal funds borrowed for improvement of existing district-owned facilities, as in the case of small reclamation projects. In 1976, 448,000 acres were eligible to receive water under these conditions. All other excess lands reported in Table 2, about 1.8 million acres, are ineligible for project water. But, 47 percent of the excess land ineligible for project water was actually served at the discretion of individual irrigation districts.

California has slightly more than 80 percent of all excess lands (Table 2). In the Westlands Water District alone, 301,971 acres of excess land are owned by 434 landowners. As of December 31, 1976, 223,757 acres of Westlands' excess land received water under recordable contract; 1,146 acres were eligible by statute; and 77,068 acres were ineligible and not served. The large amount of land under recordable contract reflects the fact that the 10-year time period since water deliveries commenced has not expired.

As a result of recent court decisions, an estimated 265,000 acres in the Imperial Irrigation District and about 660,000 acres in districts served by the Corps of Engineers' projects elsewhere in California are now excess lands. Because this land has not been subject to acreage limitation provisions until very recently, Interior's records are not complete. Most of the land served by the Corps' projects has alternate sources of water supply and it is expected that the Imperial Irrigation District case will be appealed. It is not known whether this acreage will remain excess land. The Imperial Irrigation District and Corps of Engineers' projects account for 89 percent of all land ineligible for project water, but served.

Following California in quantity of excess land are Texas, Arizona, Nebraska, Montana, and Wyoming. The latter five States account for only 7 percent of all excess lands.

Table 1 -- Land Use on Reclamation Projects, 1975

Description	Acres
Land in irrigation rotation:	
Harvested cropland and pasture	9,148,729
Cropland not harvested	139,602
Soil building	20,270
	<hr/>
Acres irrigated	9,308,601
Fallow or idle	199,267
	<hr/>
Total area in irrigation rotation	9,507,868
Land not in irrigation rotation:	
Dry cropped	143,397
Idle, fallow, or grazed	306,172
Farmsteads, roads, ditches, and drains	405,618
	<hr/>
Total area not in irrigation rotation	855,287
Urban and suburban residential, commercial, and industrial lands	566,669
	<hr/>
Total irrigable area for service	10,929,824

Source: Federal Reclamation Projects, Water and Land Resources Accomplishments--1975 (Summary Report), U.S. Department of the Interior, Washington, D.C.

Table 2. Excess Land by State, December 1976

State	Total Excess Land 1/ Number of Owners	Acreage	Eligible for Project Water			Ineligible for Project Water		
			By Recordable Contract	By Statute	By Interest	Not Served	No. of Owners	Served Acres
No.			Acres			Acres		
Arizona	53	29,960	1,099	11,724	13,263	52	26	3,822
California								
Westlands Water Dis.	434	301,971	223,757	1,146	0	77,068	0	0
Imperial Irr. Dis. 2/	---	265,000	---	---	---	---	---	265,000
Corps of Eng. Dis. 2/	753	660,608	158	3,632	0	166,998	---	489,820
Others	2,740	618,931	26,671	27,227	74,826	493,508	42	6,699
Subtotal	(3,927)	(1,846,510)	(250,587)	(32,005)	(74,826)	(737,574)	(42)	(761,519)
Colorado	42	16,371	0	0	0	15,699	5	672
Idaho	98	13,723	70	895	248	6,921	62	5,589
Kansas	3	353	171	39	0	143	0	0
Montana	174	21,760	0	0	0	9,135	99	12,625
Nebraska	180	23,474	834	5,953	1,080	6,987	90	8,619
Nevada	6	980	0	0	980	0	0	0
New Mexico	83	9,498	95	1,178	0	789	63	7,436
North Dakota	13	1,218	0	466	0	0	11	752
Oklahoma	9	1,689	1,162	93	0	0	3	434
Oregon	91	16,979	250	408	2,161	6,236	62	7,924
South Dakota	47	2,799	0	0	0	0	47	2,799
Texas	276	62,128	0	0	39,491	0	98	22,637
Utah	8	1,317	0	0	0	808	4	509
Washington	121	18,461	4,179	730	0	6,894	76	6,658
Wyoming	157	19,907	160	280	0	11,454	73	8,013
TOTAL	6,041	2,257,914	258,764	57,103	132,049	959,690	761	850,008

1/ Estimated on the basis of the irrigation district in which the land is located and does not reflect multiple ownerships.

2/ Estimated by the U.S. Department of the Interior, Washington, D.C., October 1977.

Source: U.S. Department of the Interior, Washington, D.C., October 1977.

Estimates of the amount of excess land that will ultimately be sold under the proposed rules are not precise. An individual owning excess land has several options. For example, he may simply transfer title of the property to an eligible family member. Or, he may maintain ownership of the land and use private water supplies for irrigation, or revert to dryland farming. Or, he may dispose of the excess land in compliance with the proposed rules and regulations. Of course, it is impossible to determine which options will be selected without reviewing each ownership on a case-by-case basis.

If we assume that only the land on which the irrigation district has repaid the interest and principal on Federal loans is excluded from the new rules, then 2.1 million acres are an upper limit on the amount of excess land to be sold (or transferred). However, it seems most likely that only a portion of this land will be sold by the landowners. A more realistic estimate of excess land to be sold might be obtained as follows:

258,764	acres under recordable contract to be sold over the next 10 years
57,103	acres eligible by statutes that will expire
<u>850,008</u>	acres ineligible for project water, but served
1,165,875	estimated acres of excess land to be sold (or transferred).

If the Imperial Irrigation District and projects served by the Corps of Engineers' reservoirs are excluded, less than one-half million acres of excess land will be affected. About 315,000 acres of this land are now under recordable contract or statutes that will expire.

B. Commodities Grown on Reclamation Projects

In 1975, the average gross crop value per irrigated acre on Reclamation projects was \$475 (see Table 3). The leading state was California with \$781 per acre due to its high concentration of vegetables, fruits, nuts, and grapes. California's total gross crop value of \$2.2 billion represented approximately one-half the total value of production from Reclamation projects in all States. The state with the lowest average gross value per acre was South Dakota with \$128.

Forage crops occupied the largest share of land in Reclamation projects. In 1975, 3.5 million acres (38 percent of the land) were allocated to forage crops, but provided only 16 percent of the gross value of production. Cereal crops were second in land use with 2.8 million acres (30 percent of the land) contributing 17 percent of the gross value of production. Miscellaneous field crops including cotton, sugar beets, and dry beans were planted on 1.5 million acres (16 percent of the land) and returned 18.6 percent of total value.

Vegetable crops occupied only 800,000 acres (8.6 percent of the land) but contributed 23 percent of the gross value of production from Reclamation projects. Vegetable production is concentrated in California, Arizona, and Washington. Slightly more than 30 percent of the Nation's vegetables for fresh and processed markets are produced on irrigated land receiving Reclamation water. Fruits and nuts occupied 733,000 acres (8 percent of the land) while contributing 19.3 percent of the total value of farm products. Seeds and nursery crops accounted for 231,000 acres (2 percent of the land) and 3 percent of the gross value of production.

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 The US Dept of Interior Proposed Rules for Enforcement of the Department of the Interior
 An Economic Impact Analysis
 AD-ESCS-04

REFERENCE SOURCE OF THE REQUESTED PUBLICATION, IF AVAILABLE

Calculus

Table 3 -- Average Gross Crop Value Per Irrigated Acre on Reclamation Projects, Ranked by States, 1975

State	Gross Crop Value Per Acre	State	Gross Crop Value Per Acre
California	\$781	Oregon	\$282
Arizona	652	Kansas	263
Washington	527	Wyoming	250
Colorado	347	Nevada	217
North Dakota	357	Oklahoma	196
New Mexico	324	Utah	179
Nebraska	322	Montana	149
Idaho	301	South Dakota	128
Texas	287	All 17 States	475

Source: Federal Reclamation Projects, Water and Land Resource Accomplishments--1975 (Summary Report), U.S. Department of the Interior, Washington, D.C.

C. Conclusions

Probably 0.5 to 1.0 million acres of excess land would be sold (or transferred) under the proposed rules and regulations. The estimated upper limit is based on the assumption that most excess land classified as "ineligible and not served" project water would not be sold and that most excess land classified as "ineligible and served" project water would be sold. If large amounts of land that are now ineligible and not served are actually sold, then the upper limit will approach 2 million acres. Land sales would be highly concentrated in California.

A wide variety of crops are grown on this land. Some of the most important crops by value of productions are: vegetables, fruits, cotton, sugar beets and cereal grains.

Economic and Social Impacts in Selected Regions

Primary economic and social consequences of the proposed rules and regulations concerning the sale of excess lands in the Westlands Water District and Imperial Irrigation District in California, the North Platte Project in Nebraska and Wyoming, and the Columbia Basin Project in Washington are discussed in this section. These regions were selected because they are located throughout the Western States, they represent a wide variety of commodities and farming practices, and are highly dependent on Bureau of Reclamation projects.

Principal physical and economic characteristics and the nature of farming in each region are briefly outlined. The number and size distribution of existing farm operating and ownership units are determined from available data. Farm budgets are used to examine the economic viability of alternative sizes of farms under normal operating conditions. Specific impacts of the proposed rules are considered with respect to the following factors: the amount of excess lands likely to be sold, the number and size of farming operations that may be created, changes in cropping patterns and total agricultural sales in the region, and likely changes in total population and demand for community services.

Farm budgets are used in this report to estimate returns to management and family labor as follows:

	Gross Farm Income
Less:	Farm Production Expenses (including depreciation)
	<u>Net Farm Income</u>
Less:	<u>Return to Owner's Equity</u>
	Return to Management & Operator Labor

The bottom line provides one measure of the economic viability of a farm based on a given set of assumptions. ^{3/} It shows the annual income generated by the farming operation for family living expenses. It does not measure economic efficiency which is defined in terms of cost per unit of product output. Also, returns to management and family labor do not include off-farm income which is important to many farm families.

Farm budget analysis is often controversial because of the assumptions and decisions involved. Each farm budget presented here is based on an assumed crop rotation and required complement of land, labor, buildings, machinery, and management. Crop rotations and input bundles are consistent with the general types of farming that exist in each region during a time of "normal" operating conditions. Estimated returns to management and family labor are based on recent price-cost relationships, modern production practices, and assume average to better-than-average management ability. Due to the short time span to prepare this report, major assumptions underlying the budgets presented here are not strictly comparable. Appendix table 1 summarizes these assumptions for each region. Farm budgets do not adequately reflect the risky nature of many farming enterprises and they do not specifically represent any single farm operation. ^{4/}

^{3/} Of course, non-monetary factors are extremely important. Viability depends on what the family needs or wants and is not necessarily determined by the farm budget that maximizes returns.

^{4/} For example, a decision to use average product prices tends to hide the full impact of a very low (or very high) price that may occur during a time period.

A. California -- The Westlands Water District and Imperial Irrigation District

There are approximately 33.5 million acres of farmland in California, of which 7.5 million acres are developed for irrigation. California is the leading producer of 30 commercial crops, accounting for 70 percent or more of the U.S. production of 17 of these crops. In 1974, irrigated farms in California averaged 164 acres of irrigated land per farm. Due to its varied climatic zones, crops are being planted and harvested every month of the year. The arid climate of the Westlands area and Imperial Valley (2 to 5 inches of rainfall per year) requires ample irrigation to make the land productive. In the absence of irrigation, the land produces low yields of native grasses for grazing, or is desert.

The Bureau of Reclamation is the major water supplier in the State, providing service to 2.9 million acres or 39 percent of the irrigated land. About 6 percent of the land receives full supply water and the remaining land receives supplemental water.

The following discussion focuses on the Westlands Water District and the Imperial Irrigation District. These districts account for about one million irrigable acres and an estimated 25 percent of all excess lands.

1. Physical and Economic Characteristics

The Westlands Water District is located on the west side of California's San Joaquin Valley, and is part of the San Luis Unit of the Central Valley Project. The irrigation district is about 15 miles wide by 60 miles long and is located in west Fresno County and northwest Kings County. The district is the largest in California with 572,072 irrigable acres, of which 485,000 acres were irrigated in 1976.

Soils in the Westlands District are of high quality with 85 percent of the land classified as Class I and II. The remaining land, generally along the eastern edge of the District, is in Classes III and IV and has some drainage problems. The climate is characterized by long, hot, dry summers and mild winters with an average annual rainfall of 5 inches. The typical growing season for the region varies between 275 and 325 days.

Fresno County, located almost equidistant between San Francisco and Los Angeles, and containing most of the Westlands, is the leading agricultural county in the United States. In 1970, Fresno County reported a median family income of \$8,622 (6). This was about \$2,200 below the state median family income. 5/ Fourteen percent of all Fresno County families were below the poverty level. Major cities and towns in or near the region are: Fresno (pop. 177,900); Firebaugh (pop. 6,150); Huron (pop. 2,360); and Mendota (pop. 3,720). The majority of residents reside in the eastern half of the county in the Fresno city metropolitan area.

The Imperial Irrigation District was originally a private water company which had water rights on the Colorado River prior to passage of the 1902 Reclamation Act. From 1902 to 1942, water deliveries were made through the privately-constructed Alamo Canal which ran partly through Mexico. Due to fear of disruption of

5/ Since 1970, disposable personal income per capita in California has increased about 9 percent per year.

water service below the border, local interest turned to the Federal government for assistance in constructing a new canal in the United States. From 1942 to the present, deliveries have been made through the Federally-constructed All American Canal, which also serves the Coachella Valley as part of the Boulder Canyon Project.

In 1933, there was an administrative ruling by the U.S. Department of the Interior that the 160 acre limitation did not apply to the Imperial Irrigation District. In August 1977, the Ninth Circuit Court in San Francisco ruled in *Yellen vs. Morton*, that acreage limitation provisions do apply to the Imperial Irrigation District. It is expected that this decision will be appealed.

The Imperial Irrigation District is the second largest irrigation district in the State, with a gross area of 900,000 acres and 445,000 irrigated acres in 1976. The district is located in Imperial County, which is the southeasterly-most county in the State, bordered by the Colorado River and Mexico. Soils in Imperial County are variable, ranging from medium-textured soils located in the southern portion of the District, to very heavy soils in the northeastern areas near the Salton Sea. Heavy soils are predominant, covering 71 percent of the District, medium soils cover 17 percent and light, sandy soils cover 12 percent. Medium and light textured soils are best adapted to fresh vegetable production. Rainfall averages about 2 inches annually.

Imperial County reported a median family income of \$8,257 in 1970, about \$2,475 below the State median income, with 16 percent of its families below the poverty level (6). Major cities and towns in the district are: El Centro (pop. 21,150); Brawley (pop. 13,850); Calexico (pop. 13,050) and Holtville (pop. 4,450).

Both Westlands and Imperial are important producers of field crops and vegetables (Tables 4 and 5). The proportion of land planted to perennial crops in both Districts is quite low. Vegetable production in Westlands is centered on processing tomatoes which are mechanically harvested, and spring and fall fresh vegetables. Imperial is a major producer of winter fresh vegetables such as lettuce, which are labor intensive. Due to the limited market for fresh vegetables, acreage cannot be expanded significantly without serious market price depressing effects.

2. Description of Farming

Large land holdings and farm operations have been prevalent in the Westlands Water District for many years. Prior to the arrival of Federal water, only very large farms could afford to irrigate, using high cost well water, and cropping patterns were heavily weighted toward cotton, winter barley, and a small amount of alfalfa seed production. The availability of project water has enabled operators to greatly intensify land utilization. The Westlands Water District reports there are 199 farming operations in Westlands and that the average farming operation is 2,889 acres.

Land in the Westlands Water District is controlled by 1,822 ownership units (Table 6). The average ownership unit is only 316 acres. The average farming operation in Westlands is nearly 7 times larger than the average ownership unit. Southern Pacific Land Co., with a total of 107,000 acres and recordable contracts

Table 4. Acreage and Value of Production for Major Crops, Westlands Water District, 1976

Crops	Acres	Value
		(\$1,000)
Field Crops:		
Cotton	174,733	156,172
Barley	120,126	29,078
Alfalfa seed	14,678	12,224
Alfalfa hay	18,250	10,512
Wheat	29,093	10,037
Sugar beets	16,237	7,970
Rice	2,419	1,114
Vegetables:		
Processing tomatoes	43,314	46,415
Cantaloupes	13,785	39,901
Lettuce	2,744	5,285
Dry onions	3,591	4,892
Asparagus	750	1,050
Fruits and Nuts:		
Almonds	6,108	4,784
Grapes	4,148	2,686

Source: Westlands Water District

Table 5. Acreage and Value of Production for Major Crops, Imperial County, 1976

Crops	Acres	Value
		(\$1,000)
Field Crops:		
Alfalfa hay	171,100	100,327
Wheat	156,500	50,801
Cotton	71,000	45,988
Sugar beets	58,000	37,800
Vegetables:		
Lettuce	49,900	69,365
Cantaloupes	8,850	14,071
Asparagus	4,270	8,685
Fresh tomatoes	1,766	7,984
Carrots	5,510	5,062
Squash	1,070	3,518
Onions	2,715	2,553
Processing tomatoes	1,430	1,852
Citrus	3,395	2,558
Seed and Nursery	8,929	15,355

Source: Imperial County Agricultural Commissioner's Report, 1976.

exceeding 80,000 acres, is listed as a single ownership unit. Other large excess landowners include Boston Ranch, Inc. (26,000 acres); Westhaven Farms, Inc. (11,900 acres); South Lake Farms, Inc. (9,700 acres); and Britz Fertilizer Co. (6,500 acres) (21, p. 24). Some of the largest landowners such as Giffen, Inc.; Anderson, Clayton and Co.; W.J. Deal, Inc.; and Coit Ranch, Inc., have already sold their excess land.

Table 6. Number and Average Size of Ownership Units in the Westlands Water District, 1977

Ownership Unit	Number of Units	Average Size (Acres)
Single	945	368
Joint <u>1/</u>	312	228
Multiple <u>2/</u>	565	276
Total	1,822	316

1/ Land owned by husband and wife.

2/ Includes 1,859 people in business arrangements such as joint tenancies, corporations, trusts, partnerships, and tenancies in common.

Source: Impact of Rules and Regulations - Acreage Limitation, Summary of Data for Selected Reclamation Projects, U.S. Department of the Interior, Washington, D.C., October 1977.

There are 434 owners who control 302,000 acres of excess land in Westlands and 224,000 acres are presently under recordable contracts (see Table 2). The 10-year disposition period of these contracts will be honored under the proposed rules and regulations. Table 7 indicates the acreages which must be sold by specific years. Land in the eastern and northern portions of the District will generally come up for sale first.

Table 7. Phasing of Future Excess Land Sales in Westlands

Year	Acreage to be Sold
1978	20,300
1979	19,130
1980	25,640
1981	38,530
1982	56,770
1983	27,400
1984	33,520
1985	4,100

Source: Westlands, School of Architecture and Urban Planning, University of California, Los Angeles, Calif., June 1977.

Because virtually all farming operations in Imperial County are also in the Imperial Irrigation District, Census of Agriculture data for the County reflect the characteristics of farms in the District. In 1974, there were 715 farming operations in Imperial County averaging 716 acres per farm. Farm numbers and sizes were distributed as follows:

<u>Land in Farms</u>	<u>Number of Farms</u>
Less than 50 acres	194
50 to 179 acres	141
180 to 499 acres	139
500 to 999 acres	91
1,000 to 1,999 acres	73
2,000 acres and over	77

Farming operations in the Imperial Valley have traditionally been large-scale, specializing in alfalfa hay for the Los Angeles milk-shed, cotton, feed grains, and winter vegetables. Twenty percent of the farms in Imperial County exceed 1,000 acres. Winter vegetable production is especially risky due to the high chance of a killing frost.

Sole proprietors are the most important form of business organization followed by partnerships and corporations. In 1974, Imperial farms were distributed by type of business organization as follows:

<u>Type of Business</u>	<u>Number</u>	<u>Average Size</u>
Sole proprietors	505	490 acres
Partnerships	120	1,175 acres
Corporations	84	1,463 acres
Others	6	113 acres

Data on the average size and distribution of ownership units in the Imperial Irrigation District are not readily available. ^{6/} The U.S. Department of the Interior has estimated that 265,000 acres (60 percent of the irrigated acreage) in the District are excess land. It seems likely that much of the excess land is farmed by the 150 farming operations that exceeded 1,000 acres in 1974 and is probably owned by the 204 partnerships and corporations shown above.

3. Economic Viability of Alternative Farm Sizes

Returns to management and operator labor were estimated for 160, 320, and 640 acre farms in the Westlands Water District and the Imperial Irrigation District (Tables 8 and 9). Typical crop rotations by farm size were derived from 1976 cropping patterns in each District, a recent ERS cost survey, and personal contacts with farm operators in the two regions. Returns and cost of production were estimated by the California Cooperative Extension budget generator using projected seasonal average prices for 1977, current costs and average county yields. Estimated returns to management and operator labor in Westlands and Imperial are presented in Tables 8 and 9.

^{6/} A review of the County Assessor's records revealed an estimated 949 farm ownership units in the Imperial Irrigation District.

Table 8. Estimated Returns to Management and Operator Labor, Westlands Water District Farms (Under Full Ownership) 1/

		Farm Size		
		160 Acres	320 Acres	640 Acres
Returns to Management and Operator Labor	:	\$ 25,000	\$ 54,000	\$ 81,000
Returns with 15% Price Decrease <u>2/</u>	:	10,000	23,000	25,000
Returns with 15% Price Increase	:	40,000	84,000	135,000
Returns at Current Land Price <u>3/</u>	:	15,000	34,000	41,000
	:	----- Acres -----		
Rotation: <u>4/</u>	:			
Cotton	:	74	148	222
Barley	:	37	74	148
Tomatoes	:	37	74	111
Alfalfa	:	--	--	111
Roads, farmsite	:	12	24	48

1/ Basic enterprise budgets were developed by the Fresno County Agricultural Extension Service and adjusted for machinery and equipment according to farm size. Returns are estimated using average prices received in 1976, current production costs, a pre-project land price of \$750 per acre, and average county yields.

2/ See appendix table 6 for relative risk coefficients for California crops. See appendix tables 1, 2 and 3 for further detail on assumptions, prices and yields used in constructing these budgets.

3/ Current land price, \$1,500 per acre.

4/ Assumed rotations reflect 1976 cropping patterns. Changes in the crop mix by farm size are reflected in estimated returns to management and operator labor.

Table 9. Estimated Returns to Management and Operator Labor, Imperial Irrigation District Farms (Under Full Ownership) 1/

	Farm Size		
	160 Acres	320 Acres	640 Acres
Returns to Management and Operator Labor	\$ 6,000	\$ 21,000	\$ 61,000
Returns with 15% Price Decrease <u>2/</u>	-(8,000)	-(7,000)	-(6,000)
Returns with 15% Price Increase	20,000	49,000	128,000
	----- Acres -----		
Rotation: <u>3/</u>			
Cotton	74	148	74
Alfalfa	74	148	148
Wheat	--	--	148
Sorghum	--	--	74
Cantaloupes	--	--	148
Roads, farmsite	12	24	48

- 1/ Basic enterprise budgets were developed by the Imperial County Agricultural Extension Service and adjusted for machinery and equipment according to farm size. Returns are estimated using average prices received in 1976, current production costs, including average cash rent of \$135 per acre, and average county yields.
- 2/ See appendix table 6 for relative risk coefficients for California crops. See appendix tables 1, 4 and 5 for further details on assumptions, prices and yields used in budget construction.
- 3/ Assumed rotations reflect 1976 cropping patterns. Changes in the crop mix by farm size are reflected in estimated returns to management and operator labor.

The 160 and 320 acre farms were assumed to custom hire certain planting and harvesting operations. Custom rates were based on actual rates paid by farmers in 1976. The operator was assumed to provide 2,500 hours of labor per year for all size farms. Specialty crops such as cherry tomatoes and peppers were not included in the cropping patterns because the higher per acre returns distort typical farm income and the effect of increased supply on market prices is not known.

Capital requirements by farm size are given in Table 10. Machinery complements increase as farm size increases. It is assumed that machinery costs can be financed over a 7-year period at 9 percent interest with the operator providing a 25 percent down payment. ^{7/} An attempt was made to include land costs in the enterprise budgets at a level that will most likely exist for purchasers of excess lands. When excess land is sold, the Bureau of Reclamation restricts the sale price of land to its pre-project value (i.e., the value of the land if the project did not exist). For Westlands, the most recently approved pre-project land price is \$750 per acre, compared to the current market price for nonexcess land of \$1,500 per acre. Because this discrepancy provides the lender substantial security, it is assumed that the purchaser can obtain 100 percent financing at 9 percent over 30 years. A pre-project land value has not been established in the Imperial Irrigation District because no excess land has been sold and irrigation water was available prior to the Reclamation project. Therefore, the current average cash rent of \$135 per acre is used in the Imperial farm budgets.

When examining estimated returns to management and operator labor given in Tables 8 and 9, it should be recognized that the pre-project land price (i.e., \$750 per acre) results in an annual cost advantage of about \$9,900 for each 160 acre unit of farmland in Westlands provides a cost advantage to the purchaser over other regions. For each \$100 per acre difference between market price and pre-project price, a cost advantage of approximately \$1,300 per year accrues for each 160 acre unit.

Estimated returns generated by these rotations on all sizes of farms considered, except the 160 acre Imperial farm, exceed median family incomes in the two regions. If median family income is used as a proxy for a reasonable standard of living, then all of the farms, except the 160 acre Imperial farm, may be viewed as economically viable units. Processing tomatoes and cotton are the most profitable crops (per acre) in Westlands. Lettuce, cantaloupes, and cotton are the most profitable crops in Imperial. Variable production costs were found to be somewhat higher in Imperial than Westlands, primarily due to pest control problems. (see Appendix tables 2 and 4 for additional detail).

The budgets were designed so that smaller farms in the Imperial Irrigation District would not depend on high-value, high-risk cantaloupes and lettuce. In many cases, financial institutions are reluctant to make loans to small farmers growing high-risk crops. Small tomato growers in Westlands may experience some difficulty obtaining production contracts and their small daily delivery quotas during harvest may impose added costs on custom tomato harvestors.

The prices, costs, yields and cropping patterns used here are current and reflect "normal" operating conditions. But, when interpreting the estimated returns from farm budgets, it should be recognized that prices received, costs, and crop yields vary over time and among farms. Also, budgets may understate costs such as the idle time of workers and machines between fields.

^{7/} Assumptions concerning operating capital are based on discussions with the Federal Intermediate Credit Bank and Federal Land Bank.

Table 10. Capital Requirements by Farm Size, Westlands and Imperial

	Farm Size		
	: 160 acres	: 320 acres	: 640 acres
Westlands:			
Machinery <u>1/</u>	\$ 67,456	\$ 80,481	\$170,818
Land <u>2/</u>	120,000	240,000	480,000
Total <u>3/</u>	\$187,456	\$320,481	\$650,818
Imperial:			
Machinery <u>1/</u>	\$ 49,403	\$ 90,138	\$ 183,011
Land <u>3/</u>	240,000	480,000	960,000
Total <u>3/</u>	\$289,403	\$570,138	\$1,143,000

1/ Based on all new equipment at 1976 purchase prices.

2/ Based on pre-project land price of \$750 per acre.

3/ Based on the current market land price of \$1,500 per acre. A pre-project land price has not been established in the Imperial Irrigation District.

Table 11. Cost of Producing Cotton by Farm Size, Westlands and Imperial ^{1/}

Farm Size	Westlands	Imperial
	----- cents/lb. -----	
160 acres	45.3	60.0
320 acres	41.7	54.1
640 acres	39.8	51.9

^{1/} Costs of machinery and equipment used in more than one enterprise were pro-rated to cotton based on hours of annual use. Value of cottonseed was credited to total cost.

Note: Current 1977 target price for cotton is 48.7 cents/lb; 1978 target price is 52.0 cents/lb.

While all farm sizes, except the 160 acre Imperial farm, are economically viable, the largest farms are most efficient. Using cotton production costs as an example, a comparison of the efficiency of alternative farm sizes within and between regions is presented in Table 11. Within the regions, the 640 acre farm has a 5.5 cents per pound (14 percent) advantage in Westlands and an 8 cents per pound (16 percent) advantage in Imperial. Between the regions, Westlands has a cost advantage for all sizes of farms. Much of this advantage is due to relatively low pre-project land prices in Westlands, while current cash rents are used in Imperial.

The above discussion of estimated returns to management and operator labor assumes the sale of farm products is the sole source of family income. However, Reclamation law does exclude off-farm employment. This is particularly relevant to the 160-acre farms where operator labor may not be fully employed. In California, according to the Census of Agriculture, 60 percent of all farms with sales of \$2,500 or more reported off-farm income. The average family off-farm income in 1974 was \$15,494. The per farm average for all California farms was \$9,361 which is equivalent to \$0.48 for each dollar of farm operating income (gross sales minus cash expenses).

Family off-farm income does not vary significantly by farm size, as indicated in the following table:

Family Off-Farm Income by Farm Size, California, 1974

	Farm Size (Acres)						
	100-139	140-179	180-219	220-259	260-499	500-999	1,000-1,999
Farms Reporting	1,629	1,279	706	610	1,899	1,611	995
Average Income	\$15,556	\$15,691	\$14,337	\$19,300	\$16,941	\$15,261	\$17,451

In 1974, 199 farmers in Imperial County and 360 farmers in Fresno County reported off-farm work of 100 days or more.

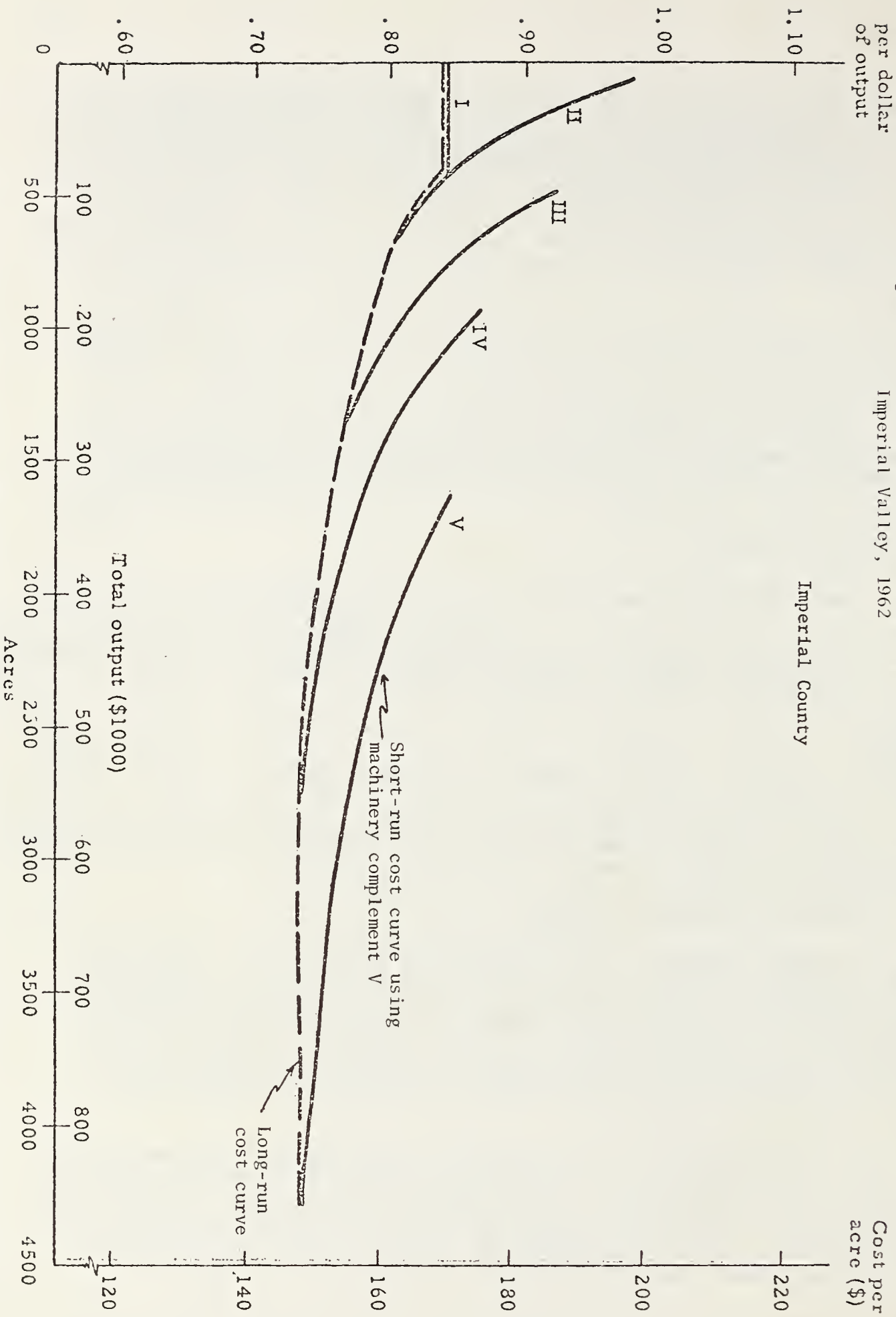
4. Major Adjustments in Farming

A 14-region, University of California statewide model (1, p. 444-455) was used to evaluate state and regional changes in cropping patterns, farm income, and the production of 9 field crops and 27 vegetable crops assuming higher production costs due to reducing average farm size under the proposed rules and regulations. The California model includes the following important features: (1) market demand relations for each crop; (2) technical constraints on irrigable land and water supply in each region; (3) risk coefficients to reflect yield variability for each crop.

The California model has been validated by comparing estimated results for 1976 (i.e., base solution) with actual production for 1976. The model was found to perform well for all major crops. The largest error occurred in estimating late spring potato production. A major limitation of the model is the exclusion of all perennial crops, including alfalfa. However, land and water supplies were reduced in each region to account for resources used by perennials.

Total cost
per dollar
of output

Figure 1. Short and Long-Run Average Cost Curves, Cash Crop Farms,
Imperial Valley, 1962



Source: Carter, H.O. and G.W. Dean, Cost Size Relationships in Imperial Valley, California, Giannini Foundation Rept. 253, Univ. of Calif., May 1962.

Table 12. Results of California Statewide Economic Model, Assuming a 10 Percent Cost Increase

Crop	Base Solution 1/ Net		10% Cost Increase Net	
	Acres	Revenue	Acres	Revenue
----- 1,000 ----- % change ----				
Region 10 includes Westlands	Vegetables 2/ Field crops 3/ Cotton	26.4 34.1 1,147.0 1,207.5	\$ 26,225 8,162 235,000 \$269,257	0 +227 - 24 - 16
Region 14 includes Imperial	Vegetables 4/ Field crops 5/ Cotton	70.2 282.3 153.2 505.7	\$ 26,058 75,490 63,190 \$164,738	- 24 + 29 - 35 + 2
Total				+ 16 + 26 - 41 - 1

1/ Derived assuming actual 1976 costs.

2/ Cantaloupes and processing tomatoes

3/ Corn and dry beans.

4/ Carrots, winter lettuce, cantaloupes, and fresh tomatoes.

5/ Barley and wheat.

To estimate the impact of cost levels for smaller scale farms in Westlands and Imperial, economies of size studies conducted by the University of California in the two regions were reviewed (2, 8). These studies show that average total cost increases about 10 percent when the size of a farm is reduced from 2,500 acres to 320 acres (see Figure 1).

Costs of production for all commodities grown in Westlands and Imperial were increased 10 percent, holding costs in the remaining regions of the State constant. Comparison of results with and without the 10 percent cost increase provides an estimate of the effect of the proposed rules. This methodology provides an estimate of the upper limit of adjustments in the State since all farms are not now at the optimum size and all farms would not be exactly 320 acres after imposition of the proposed rules.

The results of this analysis are summarized in Table 12 for two regions that include Westlands and Imperial. Because of the time constraint in preparing this study, it was not possible to define regions to precisely match the Westlands Water District and the Imperial Irrigation District. Region 10, which contains Westlands, also includes the entire area of Fresno, Tulare, and Madera Counties. Region 14 includes the Imperial, Coachella, and Palos Verde Irrigation Districts. Because of the regional boundaries, absolute changes in acreage and farm income may be overestimated, but the general trends are believed to be representative of changes that would occur in Westlands and Imperial.

Smaller farms and higher average costs of production in Region 10 and Region 14 result in a small decrease in the area devoted to vegetable crops, a significant increase in the area planted to small grains and field crops, and a shift of cotton acreage to other regions of the state having a comparative advantage. Vegetable production did not expand with the introduction of smaller farms because of limited market demand and higher producer risks. In Region 14, the decline in vegetable production was great enough to cause a more than proportionate rise in prices and higher net revenues. In summary, it appears there would be a slight decrease in the intensity of production and land utilization in both Westlands and Imperial and the total value of agricultural production would fall slightly. 8/ The crop rotations used in deriving estimated returns for the 160 and 320 acre farms are consistent with the aggregate trends suggested by the multi-region economic model.

For the State as a whole, only a few of the 37 crops included in the model were affected by the 10 percent cost increase in the two regions. Statewide price-quantity impacts are greatest for dry beans, winter carrots, winter lettuce, field corn, and sugar beets. There are no Statewide price-quantity impacts for cotton, wheat, barley and processing tomatoes.

8/ These results conflict with a recent study by Goldman (10) which suggests a change in agricultural output in Westlands in favor of increased production of alfalfa, processing tomatoes and lettuce. However, he did not take into account the market depressing effects of expanded vegetable production and the comparative advantage of other producing regions.

The impact of the proposed rules and regulations on the number and size of farms in Westlands and Imperial will vary depending on the methods used by land-owners to divest their excess lands. Some owners will transfer ownership to a spouse or close relatives, some may utilize private water, and some will sell their excess land. Of course, it is impossible to accurately project the future number and size of farms without doing a case-by-case study of existing ownership and operating units and potential buyers.

However, if we make a few simplifying assumptions, it is possible to get a notion of the potential farm structure under the proposed rules. For example, in Westlands, we now have 216 farming operations, 271,000 acres of nonexcess land, and 302,000 acres of excess land. If we assume that the excess land is divided into 480 acre farming operations (i.e., 320 acres owned by husband and wife, and 160 acres leased) and that the nonexcess land is maintained by the existing farming operations, then our hypothetical farm structure in Westlands is:

	<u>Number of Farms</u>	<u>Average Size</u>
New Operators:	629	480 acres
Old Operators:	216	1,255 acres
Total:	845 <u>9/</u>	

Based on the results presented in Table 8, we conclude that a 480 acre farm is a viable economic unit under most conditions in Westlands. The largest farms may find it difficult to maintain their average size, but a family with four members living within 50 miles of an irrigation district can easily control 1,280 acres of land. We expect that the higher risk crops would tend to be grown on the larger farming operations.

The Imperial Irrigation District has an estimated 265,000 excess acres, but the number of farming operations is much larger and the average size much smaller than in Westlands. Therefore, the potential increase in number of farming operations from the sale of excess land appears to be smaller. Some large ownership units would be divested and large farming operations that depend heavily on leasing would be forced to cut back, but there may be only a relatively small increase in the number of farms. For example, assuming a typical Imperial farming operation is 480 acres under the proposed rules and regulations, the existing 715 farms potentially account for 343,200 acres, leaving about 168,800 acres of excess land to be distributed among new farms. 10/ Thus, we might expect to find around 350 new farming operations in the 480 acre size category in the Imperial Irrigation District. 11/ These farms would be heavily involved in field crops production.

9/ If farm size in Westlands averaged 320 acres, there could be as many as 1,790 farming units.

10/ There are now 715 farms that average 716 acres per farm giving 511,940 total acres. Subtracting 715 farms at 480 acres per farm equals 168,800 acres.

11/ If average farm size declined to 320 acres, there could be nearly 1,600 farms.

If the proposed rules and regulations are applied where large farming operations play a key role in highly coordinated input acquisition and product delivery systems, then some economic efficiency may be lost. For example, a 20,000 acre fruit and vegetable farm has sufficient production to justify its own packing house. Through careful planning of production and packing activities, the flow of products from planting to marketing can be coordinated to minimize loss at each stage. An independent packing house probably has slightly higher costs because it must locate individual growers, negotiate contracts, supervise cultural practices, and schedule harvesting. Also, the largest farmers probably receive some quantity discounts when they purchase inputs. Some efficiency associated with vertical coordination would probably be lost with smaller farms, but most physical facilities and operations would be taken over by cooperatives and other businesses oriented toward serving smaller farms.

Breaking up large land holdings into smaller farms will cause disinvestment and uncertainty problems. High capacity farm machinery designed for large acreages will have to be sold to farmers in non-reclamation areas or custom operators. Such diverse items as machinery storage and repair shops, grain storage, and labor housing will have to be sold or dismantled, probably at some loss.

In areas such as Westlands, where it has been understood that land disposition is a condition of receiving subsidized irrigation water, questions of equity should be minimal. In Imperial, which has relied on an administrative ruling exempting the District from the 160 acre limitation, equity problems may be severe. Impacts due to uncertainty surrounding the Yellen vs. Morton decision are evident. Long-term investments in land improvements such as land leveling and sub-surface drainage have ceased. Land values under the proposed rules are very uncertain, and agricultural financing has been disrupted.

5. Community Impacts

To the extent that the proposed rules and regulations result in a change in the number of farms, cropping patterns, and total agricultural sales, the economic and social impacts are expected to spread out into the community. Using simplifying assumptions, it is estimated that 950 to 1,000 new farm operations could be created; about 630 farms in Westlands and 450 farms in Imperial. This involves a 300 percent increase in the number of farms in Westlands, and a 50 percent increase in Imperial.

Assuming 4.1 persons per farm household, the gross farm population increase would be about 2,600 in Westlands and 1,400 in Imperial. However, these data are not adjusted for the displacement of an undeterminable number of full-time hired workers, some of whom may themselves become land owners who previously worked on the larger farms (Table 13).

The question of where the individuals come from who will operate the new farms may depend heavily on Federal government programs and policies. For example, if the government provides no assistance, it seems unlikely that the new farmers will come from the ranks of the unemployed or underemployed farmworkers. Most of the new farms would probably be operated by individuals who are currently farming in California and have substantial farm experience. To secure necessary financing, the individual must generally have some equity and be able to convince the lender that he has the capacity to operate a successful farm. In other words, under these circumstances, most of the excess land will be farmed by individuals who are currently employed and have access to a modest supply of capital.

Although it is widely believed that smaller farms will tend toward production of higher value, labor intensive crops, our results do not generally support this conclusion. Because of constraints on market demand and the higher risk of some specialty crops, we expect a trend toward small grains and field crops and a slight decline in total agricultural sales. There will probably be no significant change in the demand for seasonal farm workers. We expect a modest decline in the demand for full-time hired labor depending on the resulting average farm size under the proposed regulations.

There is no evidence that smaller farms will create higher total agricultural sales and thereby significantly increase the demand for private and public services. In fact, total agricultural sales and net farm income in the two regions may fall slightly. However, assuming the agricultural income in the two regions will be redistributed to families with previously lower incomes, the multiplier effect on total regional income is expected to be slightly higher under the proposed rules. It does seem likely that some new families would be required to provide business and community services to an increased number of farming operations. Assuming no unused capacity exists, some new families will move into the regions to help provide transportation, education, fire, police, sanitation, and health services.

One can derive an estimate of the probable public sector impacts. Western farms in the \$20,000 to \$100,000 gross annual sales category average 4.1 persons per farm. U.S. average family size was 3.4 persons as of March 1976. California has approximately 494 full-time equivalent State and local employees per 10,000 population (46 percent of these are employed in education). Estimated population impacts in Westlands and Imperial are given in Table 13. An overall population growth of 4,687 people could be expected.

Table 13. Estimated Population Impacts in Westlands and Imperial

	Westlands		Imperial
	Fresno Co.	Kings Co.	Imperial Co.
1975 population	445,727	69,539	84,276
Number of new farms	630		350
Increase in farm population	2,583		1,435
Increase in State and local employee population	431		238

In 1975-76, the University of California estimated per capita direct general expenditures by local governments at \$768 in Fresno County and \$530 in Imperial County. Assuming all new residents migrated from outside the county, local governments would incur the following additional direct expenditures:

<u>County</u>	<u>New Residents</u>	<u>Additional Direct Expenditure</u>	<u>1974-1975 County Revenue</u>
Fresno	3,014	\$ 2,315,000	\$134,000,000
Imperial	1,673	887,000	26,000,000
Total	<u>4,687</u>	<u>\$ 3,202,000</u>	<u>\$160,000,000</u>

Additional county expenditures for families relocating within the county and additional State expenditures for families relocating within the State would be moderate.

In addition to the public sector impacts, there would be some expansion in the wholesale and retail sectors. However, even allowing for this, it appears that the proposed rules and regulations might result in an overall increase in population ranging from 4,500 to 5,000.

The population growth and increased economic activity might affect the cost of providing public services. However, when placed in perspective, there appears to be little reason for concern. For instance, the three affected counties grew in population by an estimated 64,500, or 11.6 percent, between 1970 and 1976. An addition of 4,500 to 5,000 new people to these already rapidly growing areas would have little impact above what has already taken place.

However, there is evidence that rural communities benefit in a general sense from a large number of relatively small, family-owned and operated farms. In a study of Arvin and Dinuba communities, it was concluded that a small farm town tends to be more thriving because of local interest and control, and that employment opportunities are more diversified and stable than in a town dominated by large production units. Some preliminary findings from a 1977 State of California Task Force (24, p. 4) appointed to update the Arvin and Dinuba study are as follows:

- a. The community surrounded by small farms continues to support a larger local business community;
- b. there are more schools, parks, and playgrounds in the small farm community;
- c. the small farm community supports more than four times the number of social and civic organizations; and
- d. the large farm community has become more dependent on outside sources of capital, while the small farm community has remained relatively self-sufficient.

B. Nebraska and Wyoming--The North Platte Project

The North Platte Project is located in the central high plains area of the United States. The project lies in the North Platte River Valley, beginning in Goshen County, Wyoming and proceeding to the southeast through Sioux, Scotts Bluff and Morrill Counties, Nebraska. It is 110 miles long, but only 25 miles across at its widest point. The Project is surrounded by rolling plains where dryland summer fallow-wheat and ranching are the major enterprises. The average annual precipitation is 14 to 16 inches, while the average freeze-free period is 120 to 160 days.

1. Physical and Economic Characteristics

The region in which the North Platte Project is located is predominately a farm and ranch enterprise area, with 85 percent of the total land area in farms or ranches which have annual sales greater than \$2,500. Land use in the region is shown in Table 14. Most of the land is in pasture and range, but 10 percent is irrigated.

Table 14. Distribution of Agricultural Land Use in the Region on Farms and Ranches with Sales Exceeding \$2,500, 1974.

Major Land Use	Acres (000)	Percent of Total
Non-irrigated cropland	476	13.6
Irrigated cropland	340	9.7
Woodland	54	1.5
Pasture and range	2,562	73.0
Miscellaneous	77	2.2
Total	3,509	100.0

Source: 1974 Census of Agriculture, Nebraska and Wyoming, State and County Data, U.S. Department of Commerce, July 1977.

In 1974, the total market value of crops and livestock sold amounted to \$240 million. Forty-five percent was from crops, while 55 percent was from livestock. Comparable percentages for the State of Nebraska are 42 percent from crops and 58 percent from livestock.

Total population of the four-county region is 55,900 and is distributed as follows: farm (22 percent); rural nonfarm (34 percent); and urban (44 percent). The largest cities in the region are Scotts Bluff, Nebraska (pop. 14,507), Gering, Nebraska (pop. 5,639) and Torrington, Wyoming (pop. 4,237). There are two towns in the population range of 1,000 to 2,500; three in the population range of 500 to 999; and six with populations less than 500. All but two of the 14 cities and towns in the region are located in the North Platte Project area.

Although the region is predominately agricultural, farm employment accounts for only 19 percent of the total employment. Slightly more than 60 percent of the farm employees are proprietors. The region's farm earnings in 1975 were \$74 mil-

lion compared to nonfarm earnings of \$180 million. Estimated 1975 median family income for the region is \$14,835.^{12/}

The North Platte Project includes 20 irrigation districts and has 371,736 irrigable acres. Of this total, 226,237 acres are classified as full service land. Several irrigation districts and ditch companies receive supplemental water from the Project. Those receiving supplemental supplies have water rights from other sources for their primary supply.

As shown in Table 15, Bureau of Reclamation records indicate that about 18,238 acres in 121 different ownerships are classified as excess land in the Nebraska portion of the project, and 5,789 acres in 51 ownerships are classified as excess land in the Wyoming portion. About 3,300 acres of excess land are eligible for project water by statute and 8,181 acres of the excess land are ineligible and not presently served. Thus, 12,081 acres of excess land, or about 3.3 percent of the total irrigated land in the North Platte Project, are receiving project water for which they are not eligible.

Lands in some of the specific irrigation districts within the North Platte Project will not be subject to acreage limitation provisions when construction costs are repaid. Land with this option is located in the Gering-Fort Laramie, Goshen and Pathfinder Irrigation Districts. Of the 12,081 acres of excess land ineligible for water in the North Platte Project area, 60 percent is in these three districts. Construction costs on some part of this land have already been paid. The districts have usually blocked their lands by land class and the better classes are paid off first.

The U.S. Department of the Interior has asked its solicitor for an opinion on the role of rehabilitative projects with respect to the payback option. Interior wants to know whether or not irrigation districts must pay back the rehabilitation charges in addition to construction costs before they can be released from acreage limitations. If this is required, then excess land acreage will about double for Pathfinder and Gering-Fort Laramie.

In addition to the full service acreage in the North Platte Project, several districts contract for supplemental water. Many of these contracts are under the authority of the Warren Act of 1911. The Act provides authority for the Secretary of the Interior to contract with water users for "impounding, storage and carriage of water" in connection with any reclamation project where excess storage capacity or excess canal capacity is available. Most of the Warren Act contractors in the North Platte Project Area are receiving water due to excess storage capacity. The contract water is supplemental to the districts' other water rights. Presently, there are only 151 excess acres that are receiving water under the Warren Act contracts. The Farmers Irrigation District, however, is involved in litigation with regard to its excess land status. If this litigation should be resolved in favor of the U.S. Government, there would be about 5,300 acres in 23 ownerships declared excess in the Farmers District. In addition, the case could set a precedent that would affect other contractual users in the North Platte Project in a similar manner.

^{12/} Estimated using a constant dollar distribution program obtained from the U.S. Department of Commerce and the percentage change in the region's total personal income from 1969 to 1975.

Table 15 Excess Lands, North Platte Projects, December 13, 1976

Project and Contracting Entity	Total Excess Land		Eligible for Project Water			Ineligible for Project Water	
	Number of Owners	Acreage	By Recordable Contract	By Statute	By Interest	Not Served	Served
----- Acres -----							
Gering-Ft. Laramie, Nebr. <u>1/</u>	23	1,787	--	89	--	--	1,698
Goshen, Wyo. <u>1/</u>	35	3,891	--	--	--	--	3,891
Northport, Nebr. <u>1/</u>	15	1,867	--	107	--	--	1,760
Pathfinder, Nebr. <u>1/</u>	18	4,521	--	2,645	--	--	1,876
Warren Act Contractors:							
Beerline, Nebr.	--	---	--	--	--	--	---
Brown's Creek, Nebr.	--	---	--	--	--	--	---
Central, Nebr.	--	---	--	--	--	--	---
Chimney Rock, Nebr.	9	1,091	--	292	--	799	---
Farmers, Nebr.	23	5,307	--	56	--	5,251	---
Gering, Nebr.	4	151	--	--	--	---	151
Lingle-Hill Water Users, Wyo.	6	446	--	--	--	446	0
Rock Ranch Ditch Co., Wyo.	1	163	--	--	--	163	---
Glendo Unit Contractors:							
Bridgeport, Nebr.	7	554	--	--	--	---	554
Burbank Ditch Co., Wyo.	1	111	--	--	--	111	---
Enterprise, Nebr.	2	233	--	--	--	233	---
Lucern Canal, Wyo.	6	647	--	--	--	647	---
Mitchell, Nebr. <u>2/</u>	20	2,727	--	76	--	---	2,151
New Grattan Ditch Co., Wyo.	2	531	--	--	--	531	---
Torrington, Wyo.	--	---	--	--	--	---	---
Wright-Murphy Ditch Co., Wyo.	--	---	--	--	--	---	---
Total	172	24,027	--	3,265	--	8,181	12,081

1/ Irrigation districts receiving full service water supplies
2/ Five hundred acres are not accounted for at this time.

Source: "LM Region Acreage Limitation - Land Eligibility Summary by Project," U.S. Department of the Interior, Washington, D.C., December 13, 1976.

Other private irrigation districts receive supplemental water from contracts related to the Glendo Unit of the North Platte Project. When the Glendo Unit was authorized, provisions were legislated so that up to 40,000 acre-feet of water in any one year could be stored in the Glendo dam for irrigation purposes. The stored water can be purchased by users downstream from the dam site for supplemental irrigation. There are currently 26 ownerships irrigating about 2,700 excess acres within the Glendo Unit.

Irrigators receiving supplemental water under contractual arrangements must comply with acreage limitation provisions to some degree. It has been ruled that where project water is commingled with nonproject water as a supplemental supply, only the amount of the commingled water supplied by the Bureau must be regarded as project water for purposes of the 160 acre limitation. In other words, as long as the Bureau is not delivering more than the contracted amount of water for more than 160 acres per single ownership, no excesses occur, irrespective of the number of total acres actually irrigated.

2. Farming in the Project Area

There are about 2,800 farms and ranches in the four-county region. In 1974, 2,005 farms irrigated 343,139 acres. Selected characteristics of farms in the North Platte Project are shown in Table 16.

Operating units classified as sole proprietors account for 89 percent of the total number of farms and 72 percent of the land in farms. Partnerships account for 8 percent of the farms and 11 percent of the farmland. The remaining 3 percent of the farms and 17 percent of the land are in corporations and other types of organization. Less than 30 percent of the farms are operated by tenants.

Food processing is important to the region. In 1970, 43 percent of all manufacturing employees in the region were employed in food and kindred product plants. There are three sugar beet refineries and a large portion of the sugar beets are produced under producer-processor contracts.

Corn for grain, corn silage, dry edible beans, sugar beets and alfalfa hay account for about 85 percent of the acres irrigated and about 95 percent of the value of production in the North Platte Project (Table 17). The array of crops shown is typical of the cropping pattern. This mix of crops is not likely to change drastically in the future.

Feed grains and roughages are grown on about one-half of the irrigated acres. Much of the production on this acreage is utilized by the livestock industry in the area and sold as livestock and livestock products. The importance of food crops is evident by the value of production from dry edible beans and sugar beets.

Owners, types of ownership, and number of ineligible acres of excess land receiving Federal reclamation water in the Nebraska portion of the North Platte Project were listed in a recent Lincoln Journal article, August 31, 1977. ^{17/} The ownership data show 74 landowners were irrigating 7,929 acres of excess land. These data are adequate to provide somewhat reliable inferences since 82 percent

Table 16. Selected Characteristics of Farms in the Counties
Encompassing the North Platte Irrigation Project

Item	Unit	Nebraska Counties			Wyoming Counties Goshen	Four- County Total
		Morrill	Scotts Bluff	Sioux		
<u>All Farms</u>						
Total Farms	No.	560	1,112	380	769	2,821
Irrigated Farms	No.	382	925	172	526	2,005
Land Irrigated	Acres	69,594	145,633	27,857	100,055	343,139
Land Irrigated Per Farm	Acres	182	157	162	190	171
<u>Farms with Sales Greater Than \$2,500</u>						
Total Farms	No.	534	1,023	351	716	2,624
Irrigated Farms	No.	374	881	156	495	1,906
Land Irrigated	Acres	69,328	144,597	27,254	99,152	340,331
Land Irrigated Per Farm	Acres	185	164	175	200	179
<u>Farm Operator by Tenure</u>						
Full Owner	No.	190	397	156	257	1,000
Part Owner	No.	216	282	139	311	948
Tenants	No.	128	344	56	148	676
<u>Farms by Type of Organization</u>						
Sole Proprietors	No.	497	913	305	614	2,329
Partnership	No.	28	87	34	61	210
Corporation	No.	9	22	11	40	82
Other	No.	0	1	1	1	3

Source: 1974 Census of Agriculture, Nebraska and Wyoming, State and County Data, U.S. Department
Of Commerce, July 1977.

Table 17. Crop Acres, Production and Value of Production
for the North Platte Project, 1974 and 1975

Crop	Unit	1974			1975		
		Acres	Production	\$ Value of Production	Acres	Production	\$ Value of Production
Barley	Bu.	2,673	176,446	370,538	2,260	147,656	292,360
Corn	Bu.	91,823	8,866,549	27,663,632	85,543	7,907,316	18,653,485
Oats	Bu.	3,453	178,135	249,389	3,658	172,794	244,604
Rye	Bu.	134	1,562	3,358			
Wheat	Bu.	1,064	22,793	92,312	409	14,800	45,880
Alfalfa Hay	Tons	43,555	189,398	8,333,512	45,751	182,108	8,923,292
Other Hay	Tons	4,668	7,871	338,453	5,790	10,012	480,576
Pasture	AUM	32,642	125,620	1,130,580	34,304	126,275	1,136,475
Silage	Tons	19,692	364,002	4,732,026	19,951	348,773	4,534,049
Dry Beans	Cwt.	81,563	1,752,208	40,300,784	77,971	1,521,570	28,909,830
Sugar Beets	Tons	62,239	1,141,794	31,590,220	67,976	1,347,197	31,500,963
Potatoes	Cwt.	1,101	307,185	506,856	1,825	356,150	658,878
Family Gardens	NA	596	NA	86,025	518	NA	82,825
Residue of Crops	NA	NA	NA	1,733,906	NA	NA	1,886,605
Sugar Program	NA	NA	NA	23,997,318	NA	NA	25,807,895
Total		345,203	NA	141,269,031	345,956	NA	123,157,717

Source: Federal Reclamation Projects, Water and Land Resource Accomplishments, 1974 and 1975
Statistical Appendices 1, U.S. Department of Interior, Bureau of Reclamation.

of all excess landowners were listed, representing 92 percent of the excess land receiving project water. Table 18 shows the number of landowners allegedly irrigating excess land and the acreage of excess land irrigated by type of ownership.

Table 18. Number of Ineligible Owners and Excess Land Irrigated by Type of Ownership, Nebraska

Type of Ownership	Number of Ineligible Owners	Number of Excess Acres
Individual	45	3,808
Individual and spouse	12	1,783
Partnership	2	492
Life estate	1	26
Estate	4	257
Incorporated	6	690
Trustee	1	114
Company	3	759
Total	74	7,929

Source: Lincoln Journal, Lincoln, Nebraska, August 31, 1977.

A frequency distribution of acreage of excess land by individual ownership reveals that more than half (54 percent) of the ownerships were in excess by 50 acres or less. Only five owners were in excess by more than 250 acres.

ASCS offices in Sioux, Scotts Bluff and Morrill Counties were interviewed to obtain information on the size of ownership units and tenure arrangements. Information collected included total acreage of operators with excess lands owned by each landowner, total cropland, irrigated cropland and whether the land was owner-operated or tenant-operated. Data were available on 67 of the 74 owners listed as having excess acres. The average ownership unit is 1,237 acres. Average acreage of cropland is about 474 acres, of which 375 acres can be irrigated. Twenty-four units were operated under lease or rental arrangements. It should be noted that the data include the total acreage of operations with excess lands owned by each individual within the three-county area in Nebraska.

3. Economic Viability of Alternative Farm Sizes

This section presents estimates of returns to management and operator labor for North Platte Project farms having 160, 320 and 640 acres of irrigated cropland. Two alternative rotations involving sugar beets, dry beans, alfalfa and corn for grain or corn silage are considered.

Table 19 shows that estimated annual returns to management and operator labor ranged from \$ 7,000 on a 160 acre farm using rotation A, to \$23,000 on a 640 acre farm using rotation B over the time period, 1974 to 1976. Estimated returns on

the smallest farm are below median family incomes for the region. However, because of commodity price instability, estimated returns on the farm with 150 irrigated acres using rotation A varied from \$37,080 in 1974 to a loss of \$3,987 in 1976.

Table 19. Estimated Average Annual Returns to Management and Operator Labor, North Platte Project Farms, 1974-1976

	Returns to Management and Operator Labor		
	160 Acres	320 Acres	640 Acres
Rotation A	\$ 7,000	\$14,000	\$23,000
With 15% price decrease	-(1,000)	-(5,000)	-(11,000)
With 15% price increase	16,000	31,000	57,000
Rotation B	8,000	15,000	25,000
With 15% price decrease	0	-(2,000)	-(10,000)
With 15% price increase	17,000	33,000	61,000
----- Acres -----			
Rotation A:			
Sugar beets	44	87	175
Dry beans	44	87	175
Alfalfa hay	28	59	115
Corn for grain	44	87	175
TOTAL	160	320	640
Rotation B: 1/			
Corn silage	44	87	175
TOTAL	160	320	640

1/ Rotation B is the same as rotation A except corn silage is produced instead of corn for grain.

These farm budgets were estimated from a 220-acre Nebraska farm budget which assumes a producer with better-than-average management ability using new machinery (26). The analysis uses average product prices, yields, and estimated production costs for 1974 to 1976. 13/ Average machinery investments are \$64,700 for 160 acres; \$128,200 for 320 acres; and \$258,100 for 640 acres. 14/ The budgets include a 9 percent return to land based on a current market price of \$1,270 per acre. A maximum of 360 hours of family labor was assumed to be available each month. Labor requirements in excess of this amount were costed at \$4.00 per hour.

13/ Major data sources include: the Nebraska Crop and Livestock Reporting Service, Statistical Reporting Service, and the Farm Management Extension Staff, University of Nebraska.

14/ The calculation of machinery investment assumes no economies of size in machinery use because of the time constraint involved in completing this study.

No additional income was calculated for dryland pasture or cropland since many irrigation units would not have this additional source of income. The irrigated crop acres were not adjusted for land in ditches, pits, or field roads. Use of average irrigated yield data does not allow for intra-project soil difference, thus, the resulting cost and return estimates are for an average of all soils in the project.

The above results provide insights into the economic viability of alternative farm sizes. A limited amount of up-to-date information on efficiency by farm size in the North Platte Project is available. A recent study shows that the average cost of producing sugar beets, dry beans and corn for grain is 15 to 20 percent higher on a 160 acre farm than on a 480 acre farm(20).

4. Major Adjustments in Farming

Impacts from enforcement of the proposed rules and regulations concerning the 160 acre limitation provisions would likely be quite variable among the landowners involved. To estimate the impacts of enforcement, it is necessary to speculate about the most likely options that excess owners may choose.

Data in Table 4 indicate that slightly over 60 percent of the excess landowners in Nebraska are in single name ownerships. Of those, nearly 82 percent are excess by 160 acres or less. This means that the current owner might be able to add a spouse or other eligible relative who is a nonexcess owner to the title and remove the land from excess status. Where these types of ownership changes occur, economic impacts from enforcement of the proposed rules would be relatively small.

In irrigation districts that have the option, excess landowners can pay off the construction charges against the excess lands and remove their lands from the 160 acre limitation. If the solicitor's opinion concerning rehabilitation funds, as previously discussed, is in favor of the districts, only construction costs will need to be paid. However, if the solicitor's opinion goes against the districts, an irrigator would need to pay the construction costs and the rehabilitation charges against the land. These together could amount to several hundred dollars per acre. Nonetheless, it is expected that some excess owners may choose this option rather than sell their excess lands.

Another alternative is to designate excess lands and then not receive water for land so designated. This possibility exists for all full service and supplemental operators. The irrigator must satisfy Bureau of Reclamation officials that he can physically prevent delivery of any project water, including runoff water, from non-excess lands to the designated excess.

Suppose that all 86 ownership units that receive full service supply for 9,225 acres of excess land ineligible for project water move their land to eligible status by transferring ownership or sale. According to the Lincoln Journal, 77 percent of the full supply owners have 160 acres or less of excess land. We assume they are able to transfer ownership to a person in a direct lineal relationship without disrupting the farming operation. This leaves 90 percent of the excess land, or 8,300 acres, controlled by 20 full service owners to be sold to eligible

buyers. This amount of land could be divided into fifty-one 160 acre farms causing the total number of irrigated farms in the four-county region to rise by nearly 3 percent and average acreage irrigated per farm to remain unchanged.

The above discussion does not include those who receive only supplemental supplies from the project. Farmers with supplemental service have the same options as those receiving full supplies. It seems unlikely that farmers with excess supplemental supply lands will end up selling their land.

In summary, the most likely outcome of the enforcement of the proposed rules and regulations on the North Platte Project will be a few actual ownership changes. For the majority of the ownership units, it is expected that the excess land problems can be alleviated by methods other than outright sale.

Although overall impact is expected to be small, some individual owners and tenants will undoubtedly be adversely affected. The individual who must sell some of his land will feel the effect of this adjustment in a number of ways. His net farm income will be reduced and his current net worth will be diminished since he must sell his land for less than the market value. His fixed cost related to machinery investment will remain about the same, but will be spread over fewer productive acres.

One method of measuring the reduction in returns to management and operator labor is to assume that a farmer using rotation A must sell 160 acres of his 320 acre farming operation. His returns to management and family labor would fall from \$25,912 to \$4,911 until he adjusted his machinery base, at which time his returns would be \$13,226. These comparisons indicate that although the aggregate effects of enforcing the 160 acre limitation in the North Platte Project may be small, the individual farmer who is forced to sell some of his land may be seriously affected.

In addition to owner-operators, some tenants may be adversely affected by land sales. It was estimated that 60 to 65 tenants farm part of the excess lands. If land leased by a tenant is sold through a lottery, the tenant may lose his farming base even if he is financially capable of purchasing the land.

5. Community Impacts

It appears that enforcement of the proposed rules would have negligible community impacts. If all excess lands have to be sold in order to comply, the well-being of some excess landowners would be adversely affected because of reduced net farm incomes. However, the income position of those who acquire the land might be improved.

Ownership transfers are not likely to affect economic activity significantly. Even if all excess lands were sold, the land would continue to be irrigated and produce the same mix of crops as is currently produced. Thus, total income and expenditures in the region would be unchanged.

The change in average size and number of farms would probably be negligible. Farm and nonfarm populations, local business activity, tax revenues, and government services would not be affected. If some owners choose to designate land and dry it up, their water rights could be transferred to other irrigators. Again, a transfer between individuals takes place, but the transfer is not likely to affect the overall economic activity of the area.

The most extreme effect on the community would result if all landowners holding excess land chose to comply with the proposed rules by not irrigating. If all 12,081 acres revert to dryland alfalfa, the direct affect would be a reduction in direct gross income to the farmers of \$2.7 million annually. Based on income multipliers developed by the University of Nebraska, it is estimated that total community economic activity (i.e., farm and nonfarm sales) would decline about \$6.2 million per year.

Just as enforcement is not likely to have major negative impacts, neither is it likely to have major positive effects. The number and size of farms will change little. The possibility of change bringing about more family farms is remote. Furthermore, there is not likely to be any increase in regional economic activity.

C. Washington--The Columbia Basin Project

The Columbia Basin Reclamation Project is situated in Central Washington. Water for irrigation is obtained from the Grand Goulee Dam and Reservoir on the Columbia River. About 75 percent of the excessland in Washington State is in the Columbia Basin Project.

1. Physical and Economic Characteristics

The Columbia Basin Project comprises 2.5 million acres. As of December 31, 1976, total irrigable land for service was 578,701 acres and 98 percent of the land was eligible for project water. Major water supply facilities are being constructed for an additional 560,000 irrigable acres located in the eastern portion of the Project. The Columbia Basin Project is divided into three irrigation districts: East, South, and Quincy (West).

The Project is situated within the boundaries of Adams, Franklin and Grant Counties. The largest cities are in the 10,000 to 15,000 population category. Farm population on irrigated farms was reported by the Bureau of Reclamation to be 15,274 in 1976. The 1969 Census of Agriculture shows 3,019 farms in the three counties, of which 2,169 are classed as irrigated farms. Estimated 1977 median family income for the State of Washington is \$16,800 (27).

Most of the land is nearly flat or gently rolling and the soils are generally well suited to irrigated farming. Precipitation is only 7 to 10 inches annually. The growing season averages 165 days with a range of 135 to 200 days. Irrigation is carried out from March to early October. Sprinkler irrigation is used on 56 percent of the land, with the remaining land irrigated by gravity methods.

Acreages of the most important crops grown in the Columbia Basin Project are given in Table 20. In 1976, there were 114,078 head of cattle; 2,578 swine and 4,813 sheep on the project. Livestock numbers are down substantially from 1971-73 averages.

Table 20. Acreage of Selected Crops, Columbia Basin Project, 1976

Crops	Acres	Crops	Acres
Wheat	141,355	Seeds	26,764
Alfalfa hay	133,525	Beans, dry	19,824
Sugar beets	43,214	Other vegetables	19,313
Potatoes	39,156	Irrigated pasture	18,154
Corn, feed grain	28,732	Corn silage	13,354

Source: U.S. Department of the Interior, Bureau of Reclamation Crop Census, 1976.

A new area, estimated at about 50,000 acres of irrigated land, has been developed using private wells in the Black Sands Area west of Moses Lake. But, the Bureau of Reclamation has determined that the source of water is the Columbia Basin Project and, therefore, acreage limitation provisions apply.

2. Farming in the Project Area

The Project lands have been divided into farm ownership units largely in conformity with Reclamation law. There are 6,675 farm ownership units with an average of 87 acres of irrigable land per unit.

In 1937, legislation was passed to prevent land speculation in the Columbia Basin Project. This law states that all irrigable land held by an owner in excess of 40 acres shall be designated as excess land and not entitled to receive water. Husband and wife were viewed as separate persons and permitted to own 80 acres.

Land ownership on the project was again modified by the Columbia Basin Project Act of 1943. Lands were to be segregated into ownership units of sufficient acreage to support an average size family at a suitable level of living. No farm ownership unit should be less than 10 acres nor more than 160 acres of irrigable land.

Today, there are an estimated 2,150 farming operations in the Columbia Basin Project. Table 21 shows considerable growth in the number of farms over 160 acres, while the number of farms under 160 acres has declined. In 1973, more than one-half of the farm operations were 160 acres or less. Apparently many of these are part-time farms. Eighty-two percent of the farms were less than 320 acres, and about 97 percent of the farms were 640 acres or less. The 76 largest farms account for 76,577 acres, or 13 percent of the irrigated land, and average more than 1,000 acres. Leases are used by most large farm operators. Several very large specialty crop operations are included.

Table 21. Number and Size of Farming Operations, Columbia Basin Project, 1958 to 1973

Irrigable Acres	Number of Farms			
	1958	1965	1968	1973
Less than 80 acres	566	319	306	428
80 to 160 acres	995	950	806	823
161 to 319 acres	377	641	633	633
320 to 640 acres	76	244	317	330
641 to 999 acres	12	35	42	53
1,000 acres or more	0	12	21	23
	2,026	2,201	2,125	2,290

Source: U.S. Bureau of Reclamation, unpublished data, Ephrata, Washington.

The U.S. Department of the Interior reports that irrigable land in the Columbia Basin Project is distributed among 6,675 owners as follows:

	<u>Number of Owners</u>	<u>Acres per Owner</u>	<u>Percent of Total Acres</u>
East Columbia Basin	2,775	48	23
South Columbia Basin	1,776	106	33
Quincy-Columbia Basin	1,980	115	39
USBR Well Lic. Program	144	200	5

A single individual has been legally permitted to establish ownership units in more than one irrigation district.

Seventy-nine owners control 13,751 acres of excess land in the project (see Table 22). Two-thirds of the excess land is in the USBR Well Licensing Program and 50 percent of this land is eligible for water because recordable contracts have been signed. In 1976, water was delivered to 3,254 acres (53 owners) classified as ineligible for service.

3. Economic Viability of Alternative Farm Sizes

Washington State University has recently completed an analysis of farm size in the Columbia Basin Project (15). Budgeting and mathematical programming techniques were used to examine efficiency and net returns by alternative farm sizes.

Irrigated farms of 160, 320, and 640 acres growing alfalfa, wheat, sugar beets, and potatoes were analyzed. Three irrigation systems and three sets of buildings, machinery, and equipment typically found in Washington were selected. Total capital investment for the three farm sizes average \$326,000; \$619,000; and \$1,138,000 per farm, respectively.

Estimated returns to management and operator labor on a wheat and potato farm are given in Table 23. The base period results were calculated using current prices received (i.e., \$2.57 per bushel for wheat and \$54 per ton for potatoes), current input costs, average yields for 1974 and 1976. A wheat and potato rotation maximizes net returns given the assumptions of the Washington State University study (15). All farms in the Columbia Basin Project do not specialize in wheat and potato production. Their returns to management and operator labor may tend to be lower than shown in Table 23.

It is assumed that land with a current market price of \$1,500 per acre is financed over a 25-year period at a 9 percent interest rate, with the owner providing 25 percent equity. A 6 percent return on the owner's capital is deducted. Land with a pre-project value of \$400 per acre is assumed to be purchased with 100 percent financing over 25 years.

Table 23. Estimated Returns to Management and Operator Labor, Columbia Basin Project

<u>Alternative Farm Sizes (Acres) 1/</u>	<u>Current Land Price</u>	<u>Pre-Project Land Price 2/</u>	<u>25 Percent Price Increase</u>	<u>25 Percent Price Decline</u>
160	\$ 19,000	\$ 35,000	\$ 55,000	\$ 5,000
320	53,000	85,000	145,000	25,000
640	125,000	189,000	309,000	69,000

1/ Net returns are maximized on a wheat and potato farm with rill irrigation.

2/ Bureau of Reclamation reports pre-project land price to be \$400 per acre.

Table 22. Excess Lands, Columbia Basin Project, December 31, 1976

	Total Excess Land		Eligible for Project Water			Ineligible for Project Water	
	No. of Owners	Acreage	By Recordable Contract	By Statute	By Interest	Not Served	Served
----- Acres -----							
East Columbia River	10	1,092	--	92	--	596	404
South Columbia River	--	--	--	--	--	--	--
Quincy-Columbia Basin	58	3,318	--	320	--	2,541	457
USBR Well Licensing Program	11	9,341	4,179	--	--	2,760	2,393
Total	79	13,751	4,179	412	--	5,897	3,254

Source: "Pacific Northwest Region Acreage Limitation - Land Eligibility Summary by Project and Contract Entity,"
U.S. Department of the Interior, Washington, D.C., December 1976.

Using the base period assumptions, a reasonable standard of living is generated on all farm sizes (i.e., compared to median family income in Washington). However, with a 25 percent reduction in wheat and potato prices, only the largest farm yields a positive return to management and operator labor.

Analysis of cost data indicates considerable efficiency gain in moving from a 160 acre farm to a 320 acre farm, but not as much gain between a 320 acre farm and a 640 acre farm. This trend is shown by data on total costs per dollar of total revenue for farms using rill irrigation (Table 24).

Table 24. Total Costs Per Dollar of Total Revenue by Farm Size

Crops	Farm Size		
	160 Acres	320 Acres	640 Acres
Alfalfa	0.50	0.46	0.46
Wheat, alfalfa and potatoes	0.66	0.58	0.54
Wheat and potatoes	0.66	0.60	0.56

4. Major Adjustments in Farming

Enforcement of the proposed rules and regulations would have a small impact on farming in the Columbia Basin Project. There are only 13,751 acres of excess land, not accounting for ownership in more than one irrigation district. Nearly 6,000 acres of excess land are not served by project water.

If we assume that all excess land is sold and that it is incorporated into new 480 acre farming operations, then slightly less than 30 farms will be created. Of course, not all 13,751 acres of excess land will be sold. Some acreage will remain in dryland farming, or use private sources of water, and some excess land will be purchased by or leased to existing farmers.

Some of the largest farming operations in the Project now lease more land than would be allowed under the proposed rules. Making this land available would result in expansion of some smaller farms and a few new farms. At this time, we do not have sufficient information on leasing to support more explicit conclusions.

To the extent that ownership transfers have occurred and the subsidy value of Reclamation water is capitalized into land prices, present owners would be penalized if they are required to sell at dryland prices (\$350 per acre vs. \$1,500 per acre for irrigated land).

The more intensive crops such as potatoes and sugar beets tend to be grown by the large farm operators. Enforcement of the proposed rules and regulations could reduce the production of these crops and increase production of less intensive crops. In turn, processing activities and associated employment in the region might be slightly reduced.

5. Community Impacts

Several potential adjustments in the local economy with enforcement of the proposed rules seem to be offsetting, leading to a tentative conclusion that overall community impacts would not be significant. Some decreases in employment and economic activity could accompany the reduction of large farming operations and less production of the more intensive crops and local food processing. Conversely, more farm families would enlarge the population and increase the demand for private and public services.

Appendix I. Glossary

The definitions of some key terms pertaining to Reclamation law and procedures are presented below. These definitions and several others were presented in the Federal Register, Vol. 42, No. 165, Sec. 426.4, August 25, 1977.

1. Irrigable land, the area to which acreage limitations are applicable, is the net acreage possessing irrigated crop production potential, after excluding areas that are occupied by and currently used for homesites, farmstead buildings, and corollary permanent structures such as feed lots, equipment storage yards, and similar facilities, together with dedicated roads open for general unrestricted use by the public.
2. Nonexcess land is irrigable land beneficially held by one landowner that does not exceed the acreage permitted by statute. Unless otherwise authorized by statute, nonexcess land is 160 irrigable acres in the beneficial ownership of one individual or entity, or 320 acres owned jointly by husband and wife.
3. Excess land is irrigable land served with water from any Federal project under reclamation laws, exclusive of exempt acreage, beneficially held by one landowner which is in excess of that acreage which is non-excess.
4. Exempt land is that area of privately owned irrigable land to which the acreage limitation provisions do not apply by statute.
5. District shall mean any entity which has contracted with the United States for a water supply.
6. Eligible nonexcess owner is an individual who (a) has his or her principal place of residence on or in the neighborhood of the land or who has under oath stated his or her intent to establish such a principal place of residence within three years of acquisition of the land; (b) will not, after the acquisition, be the owner of more than 160 acres of land which receives water from any Federal project governed by reclamation law; and (c) has met all other requirements of reclamation law and these rules.
7. Project water is water furnished by or through Federally financed facilities to a District pursuant to a water service or repayment contract with the United States.
8. Commingled water is that water comprising project and nonproject water delivered by or through a nonfederally constructed facility.
9. Class 1 irrigable land is that arable land which, under a plan of essentially full water supply, has the physical capability necessary for sustained long-term irrigation production; and, on the basis of both physical and economic criteria applicable within the climatic limitations of each project, is determined by the Secretary of the Interior to have

adequate income potential to support a family and pay water charges when irrigated in farm units of 160 acres or less.

10. A recordable contract is a document wherein the landowner agrees to sell his designated excess lands upon terms and conditions satisfactory to the Secretary and at prices not to exceed those fixed by the Secretary in order to receive project water for those excess lands.

Appendix 11. Exemption and Modification of Acreage Limitation

There are several statutes involving exemption and modification of the acreage limitation, Class 1 acreage equivalency, use of interest payments for excess lands, and the delivery of project water to certain categories of excess landowners (e.g., a surviving spouse). The following projects are:

a. Exempt from acreage limitation

1. Colorado-Big Thompson Project (Colorado)
2. Truckee Storage and Humboldt Projects (Nevada)
3. Owl Creek Unit, Missouri River Basin Project
4. Santa Maria Project (California)
5. Beaverhead Valley (Montana), East Bench Unit, Missouri River Basin Project
6. San Felipe Division, Central Valley Project (California)
7. Narrows Units, Missouri River Basin Project (Colorado)

b. Subject to modifications of acreage limitations

1. San Luis Valley Project (Colorado)
2. Nonexcess holding set at 480 irrigable acres, Kendrick Project (Wyoming)

Appendix Table 1. Major Assumptions Used in Farm Budgets

	Westlands	Imperial	North Platte	Columbia Basin
Product prices	Projected seasonal average, 1977		State average, 1974 to 1976	Wheat, \$2.57/bu. Pot., \$54/ton
Crop yields	County average, 1976		State average, 1974 to 1976	Current yields under good management
Land costs:				
Current market price	\$1,500	\$1,500	\$1,270	\$1,500
Pre-project price	750	N.A.	N.A.	400
Interest rates	9%	9%	9%	9%
Other input costs	State average, 1976		State average, 1974 to 1976	1975, 1976
Maximum hours of family labor	2,500	2,500	4,320 <u>1/</u>	2,400

1/ 360 hours per month.

Appendix Table 2. Estimated Returns and Costs for Westlands Water District Crops by Farm Size, 1977

Farm Size (Acres)	Cotton		Alfalfa	Barley	Tomatoes	Sugar Beets	Alfalfa Seed
	Yield	Lint	Seed				
	1,100 lbs.	1.05 Ton	8.5 Ton	40 Cwt.	25 Ton	23 Ton	700 lbs.
	Price 1/	\$0.60	\$105.00	\$ 60.00	\$ 4.25	\$ 50.00	\$ 1.25
	Gross Returns	\$770.25	\$510.00	\$170.00	\$1,250.00	\$437.00	\$714.00
160	Variable Cost	\$418.68		\$128.00	\$812.01		
	Fixed Cost	121.68		77.21	128.91		
	Land Cost	67.50		67.50	67.50		
	Total Cost	\$607.86		\$272.71	\$1,008.42		
	Net Returns	162.39		-102.71	241.58		
320	Variable Cost	\$421.07		\$129.19	\$807.19		
	Fixed Cost	80.45		44.27	102.95		
	Land Cost	67.50		67.50	67.50		
	Total Cost	\$569.02		\$240.96	\$ 977.64		
	Net Returns	201.23		-70.96	272.36		
640	Variable Cost	\$416.59		\$130.56	\$808.64		
	Fixed Cost	63.62		29.48	79.88		
	Land Cost	67.50		67.50	67.50		
	Total Cost	\$547.71		\$227.54	\$ 956.02		
	Net Returns	222.54		-57.54	293.98		

1/ Note announced target prices for cotton, 47.8 cents/lb.; wheat, \$4.83/cwt.; barley loan rate, \$3.40/cwt.; and sugar program, \$22.84/ton.

Appendix Table 3
 Budgets for 160, 320 and 640 Acre Farms
 (Under Full Ownership)
 Westlands Water District, 1977

		Returns to Management and Operator Labor	
Crop	Acres	Per Acre	Total
<u>160 Acre Farm</u>			
Cotton	74	\$162.39	\$12,017
Barley	37	-(102.79)	-(3,803)
Canning Tomatoes	37	241.58	<u>8,938</u>
Roads & Farmsite	<u>12</u>		
Total	160	Farm Net Income	\$17,152
		Less Allowance for Cash Flow ^{1/}	1,361
		Plus Earned Operator Labor	<u>9,256</u>
		Total Return	<u>\$25,047</u>
<u>320 Acre Farm</u>			
Cotton	148	\$201.23	\$29,782
Barley	74	-(70.96)	-(5,251)
Canning Tomatoes	74	272.36	<u>20,155</u>
Roads & Farmsite	<u>24</u>		
Total	320	Farm Net Income	\$44,686
		Less Allowance for Cash Flow	2,336
		Plus Earned Operator Labor	<u>11,250</u>
		Total Return	<u>\$53,600</u>
<u>640 Acre Farm</u>			
Cotton	222	\$222.54	\$49,404
Barley	148	-(57.54)	-(8,516)
Canning Tomatoes	111	293.98	32,632
Alfalfa Hay	111	7.30	<u>810</u>
Roads & Farmsite	<u>48</u>		
Total	640	Farm Net Income	\$74,331
		Less Allowance for Cash Flow	4,743
		Plus Earned Operator Labor	<u>11,250</u>
		Total Return	<u>\$80,859</u>

^{1/} Due to difference in cash flow and depreciation allowance.

Appendix Table 4. Estimated Returns and Costs for Imperial Irrigation District Crops by Farm Size, 1977

Farm Size (Acres)	Cotton	Alfalfa	Wheat	Sorghum	Cantaloupes
	Lint Seed				
	Yield 1,250 lbs., 1.0 Ton	8.5 Ton	50 Cwt.	50 Cwt.	175 Ctn.
	Price <u>1/</u> \$ 0.60 \$105.00	\$ 60.00	\$ 4.45	\$ 3.96	\$ 10.40
	Gross Returns \$855.00	\$510.00	\$222.50	\$198.00	\$1,820.00
160	Variable Cost Fixed Cost Land Cost Total Cost Net Return	\$287.67 106.52 135.00 \$520.19 -10.19			
	\$557.94 161.83 135.00 \$854.77 0.23				
320	Variable Cost Fixed Cost Land Cost Total Cost Net Returns	\$277.45 102.36 135.00 \$514.81 - 4.81			
	\$560.52 185.17 135.00 \$780.69 74.31				
640	Variable Cost Fixed Cost Land Cost Total Cost Net Return	\$278.07 99.35 135.00 \$512.42 - 2.42			
	\$554.19 64.06 135.00 \$753.25 101.75	\$136.33 30.50 135.00 \$301.38 -78.88	\$136.33 34.50 135.00 \$305.82 -107.82	\$1,167.62 88.87 135.00 \$1,391.49 421.51	

1/ Note announced target prices for cotton, 47.8 cents/lb; wheat, \$4.83/cwt.; barley loan rate, \$3.40/cwt; and sugar program, \$22.84/ton.

Appendix Table 5

Budgets for 160, 320 and 640 Acre Farms
(Under Full Ownership)
Imperial Irrigation District, 1977

Returns to Management
and Operator Labor

Crops	Acres	Per Acre	Total
<u>160 Acre Farm</u>			
Cotton	74	\$.23	\$ 17
Alfalfa	74	-(10.19)	-(754)
Roads & Farmsite	<u>12</u>		
Total	160	Farm Net Income	-(737)
		Less Allowance for Cash Flow ^{1/}	353
		Plus Earned Operator Labor	<u>6,914</u>
		Total Return	\$ 5,824
<u>320 Acre Farm</u>			
Cotton	148	\$ 74.31	\$10,998
Alfalfa	148	-(4.81)	-(712)
Roads & Farmsite	<u>24</u>		
Total	320	Farm Net Income	\$10,286
		Less Allowance for Cash Flow	644
		Plus Earned Operator Labor	<u>11,250</u>
		Total Return	\$20,892
<u>640 Acre Farm</u>			
Cotton	74	\$101.75	\$ 7,530
Alfalfa Hay	148	-(2.42)	-(358)
Wheat	148	-(78.88)	-(11,674)
Grain Sorghum	74	-(107.82)	-(7,979)
Cantaloupes	148	428.51	<u>63,419</u>
Roads & Farmsite	<u>48</u>		
Total	640	Farm Net Income	\$50,938
		Less Allowance for Cash Flow	1,307
		Plus Earned Operator Labor	<u>11,250</u>
		Total Return	\$60,881

^{1/} Due to difference in cash flow and depreciation allowance.

Appendix Table 6
Relative Risk Coefficients^{1/} for Selected California Crops

Crop	Yield	Price	Gross Income
Alfalfa Hay	2.1%	3.4%	3.2%
Barley	3.9	2.8	3.4
Dry Beans	3.4	3.9	3.1
Cantaloupe (Summer)	7.7	7.5	11.2
Corn (Grain)	2.3	3.9	7.1
Cotton	7.0	7.0	8.1
Lettuce (Early Spring)	6.8	28.5	16.1
Potato	3.2	20.9	16.0
Safflower	6.7	3.3	5.9
Alfalfa Seed	6.3	8.6	8.7
Grain Sorghum	2.3	4.6	4.1
Sugar Beets	6.2	1.7	6.5
Tomatoes (Processing)	4.4	6.3	5.1
Wheat	4.5	3.2	5.1

^{1/} Coefficient of Variation = $\frac{\text{Standard Deviation}}{\text{1969-73 Mean}} \times 100$

Note that the prices and gross returns per acre for lettuce, potatoes and cantaloupes are all subject to much greater variability than alfalfa hay, barley and dry beans.

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